

**Proyecto Puentes de Salud:
Implementation of Cardiovascular Screening in Rural Mexico
Program and Evaluation Plan**

By

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Abstract:

According to the World Health Organization, approximately 17.5 million people died of cardiovascular disease in 2005.¹ In Mexico, heart disease has steadily been increasing over the past 30 years to become the leading cause of death in the country.^{2, 3} Because the burden of disease is high for Coronary Heart Disease (CHD), the progression is slow and preventable, treatment is effective, and the detection tools are cheap and accurate, both the National Cholesterol Education Program and the United States Preventive Services Task Force have recommended cholesterol screening in the adult population.

In particular, rural Mexican communities suffer from an identical CHD disease burden compared to the national average, yet farming communities may have less access to care to prevent and treat the disease; 75% of physicians in Mexico are located in sixteen urban areas.⁴⁻⁶ For this reason, Proyecto Puentes de Salud (PPS) has conducted cardiovascular and associated risk factor screening in the rural farming communities of Juventino Rosas, Mexico for the past two years. Thus far, PPS planners have not examined the program screening implementation to determine if the current methods are the most effective means to achieve the program's objectives. Therefore, this paper is a program plan and evaluation manuscript directed at appraising PPS's cardiovascular screening implementation in more depth.

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Introduction

Introduction to Proyecto Puentes de Salud

Continual planning and evaluation are important to ensuring that a project is being run efficiently and is truly achieving its primary goals. This manuscript is a program planning and evaluation paper that examines Proyecto Puentes de Salud (PPS), a research, Spanish immersion, and service learning project developed two years ago by medical students in response to an expressed need by the rural community of Juventino Rosas, Mexico. PPS sends UNC-Chapel Hill and Duke faculty, doctors, and first year medical students to Juventino Rosas for six to eight weeks each summer. These volunteers provide free cardiovascular and HIV screenings and education in small farming communities that have limited access to care. The aims of the program are to improve community health and knowledge and to facilitate student leadership, cultural competency, clinical aptitude, and research skills.

Since a main objective of PPS is to improve community health, I will focus my planning and evaluation on the process of screening implementation in Mexico, examining the methods that the project uses to achieve that purpose. I will assess the cardiovascular health screenings because 1) cardiovascular disease, particularly arteriosclerosis and coronary heart disease (CHD), is an escalating health problem with a growing burden of disease among Mexican residents and immigrants to the US; and 2) currently, cardiovascular screening is our central outreach.

Rationale for Health Screenings in Juventino Rosas, Mexico

Juventino Rosas (JR) is a rural Central Mexican municipality in the state of Guanajuato with a population of approximately 65,000.⁷ The primary occupation is agriculture; the central town of JR is surrounded by more than 20 farming communities, each populated by 100 to 5,000

people. According to the World Bank, income per capita in Mexico is US \$7,310. Poverty in rural Central Mexico hovers around 30%, compared to 17% in urban Central areas.⁸

Access to care issues are prevalent in the JR area. The nearest tertiary care facility that serves the municipality is approximately 45 minutes away by vehicle. Some villages have “casas de salud”, but these health centers only house reading material and rarely employ a lay health worker. Although the government has recently built a new hospital in JR, officials have directed the allotted funding almost entirely towards building infrastructure; verbal interviews with local doctors and the municipal Secretary of Health and Education have revealed that the hospital does not have money for equipment and has one ambulance, one defibrillator, and no ECG machine. Few people go to the new hospital, partly because they do not trust the government, and partly because the hospital does not have equipment. Waiting times for necessary surgeries at any facility may be as long as three or four months.^{9, 10}

In interviews, the local inhabitants cited socioeconomic, cultural, and political reasons for the access to care problems.⁶ A need exists for accessible health services within the satellite communities of JR. In the fall of 2005, community members from both JR and Carrboro, NC, the sister city of JR in the US, expressed an interest in a medical project in Mexico. In response, Ian Nelligan and Dr. Sandy Clark traveled to Mexico in 2005 to conduct a needs assessment, and discovered overwhelming community support for cardiovascular health screenings and education.

Rationale for Cardiovascular Screenings

CHD is a disease with significant morbidity and mortality, and is defined as, “symptomatic ischemic heart disease, including myocardial infarction, stable or unstable angina, demonstrated myocardial ischemia by noninvasive testing, and history of coronary artery

procedures.”¹¹ Major modifiable risk factors include increased low density lipoprotein cholesterol (LDL-C), decreased high density lipoprotein cholesterol (HDL-C), elevated triglycerides, hypertension, smoking, thrombogenic/hemostatic states, obesity, diabetes, physical inactivity, and an atherogenic diet.¹¹

Cardiovascular health in Mexican communities is important for numerous reasons. Heart disease in Mexico has been steadily increasing over the past 30 years to become the leading cause of death in the country. Mortality rates have climbed for diabetes, myocardial infarction, and hypertension parallel to increases in obesity regionally and nationally.^{2, 3} According to the American Heart Association and World Health Organization, the 2004 death rate for cardiovascular disease was 273 per 100,000 population years for Mexican men 35-74 years old. Although this number is lower than the US rate of 348 per 100,000 population years, the death rate for Mexican women surpassed the rate for US women (197 compared to 177.)¹²

Although some urban investigations, such as the San Antonio Heart Study, have fairly comprehensive data sets on the multiple variables that contribute to CHD in Mexico, little information is available on the overall cardiovascular health of rural Mexicans.¹³ One small study (n=73) demonstrated that the prevalence of the metabolic syndrome among rural Mexicans was significantly higher than the prevalence at the national level.¹⁴ Data from a larger study have revealed that the poor in rural Mexico have proportionate rates of overweight and obesity to the national rates.⁴ Although the rates for risk factors may be similar, farming communities may have less access to care to prevent and treat the disease; 75% of physicians in Mexico are located in sixteen urban areas.⁵

Overall, little data on rural Mexicans exist, and one should not extrapolate data from a study with 73 participants to all rural Mexican adults. Additionally, many of the larger rural

studies key in on a few factors, looking only at overweight or hypertension and neglecting the full range of cardiovascular risk factors.^{4, 15} Hispanics represent the fastest growing minority group in the US, with a growth rate of 394% in North Carolina during the 1990s. A large percentage of these immigrants hail from rural farming villages, therefore information on this burgeoning patient population's antecedent lifestyles and cardiovascular risks is necessary.^{16, 17}

Screening Method Improvement

Some major assumptions are that the screening implementation is important in maximizing the benefit to a community and that screening for cardiovascular risk factors does improve a society's health. Using appropriate screening implementation is critical to improving a population's well-being for several reasons. Tailoring the methods to a specific community structure maximizes public understanding of, acceptance of, and participation in a project and its ideas. In any society, external factors such as politics, the environment, culture, and religion influence the interaction between the local people and the program. If screenings do not adapt to address these variables, the medical outreach may be ineffective.¹⁸⁻²⁰

Screening for cardiovascular risk factors is an appropriate first step to improving a society's health. According to the American Heart Association and the Adult Treatment Panel III (ATPIII) report, a third of persons who have a myocardial infarction are under the age of 65 and a third die within 24 hours.^{21, 22} CHD is a condition that has a high burden of suffering, is extremely prevalent, and that develops slowly, thus allowing for monitoring and detection of the disease. Screening promotes early discovery of risk factors that can be modified through preventive measures and lifestyle changes, a more satisfactory approach than treating a patient

after the irreparable damage has been done, particularly considering that the first symptom of disease is often an infarction.

The 2007 United States Preventive Services Task Force (USPSTF) gave an “A” recommendation for blood pressure screening in adults and lipid screening in men older than 35 years and women older than 45 years. The task force concluded that the substantial burden of suffering produced by CHD, the existence of effective treatment, and the reliability of tests support lipid screening and blood pressure monitoring in the general population.^{23, 24} Treating and counseling at-risk individuals early in the disease progression should increase awareness of CHD and its prevention, as well as reduce mortality, medical costs, and disabilities such as congestive heart failure, angina, arrhythmias, and risk of sudden death.²¹

The goals of this paper are to outline the program, Proyecto Puentes de Salud, and to evaluate the project’s screening implementation, serving as a template for future project improvements. The project initiated cardiovascular screenings to align with an expressed need of the rural Mexican communities surrounding Juventino Rosas, however more structured planning and thorough evaluation are necessary to maximize the effectiveness of the screenings. This paper consists of a program plan and a program evaluation of Proyecto Puentes de Salud, with a focus on the implementation of cardiovascular screening. A portion of the evaluation component will include focus groups and qualitative data that explore project member attitudes and opinions towards the effectiveness of screening methods.

Review of the Literature

Before implementing a cardiovascular screening program, knowledge of the standard practice guidelines is critical. I reviewed the literature to answer to following question: What are

the evidence-based guidelines for cholesterol screening in the general adult population? In addition, information on other programs' screening practices would also be useful to PPS, therefore I posed a second question: In cardiovascular screening programs that have been implemented in rural Mexican populations, what are the screening methods used?

Practice Guidelines for Cholesterol Screening

Key Question: What are the evidence-based guidelines for cholesterol screening in the general adult population?

Search Strategy:

I searched PubMed with the MeSH terms “Hypercholesterolemia OR Cholesterol AND screening AND Guideline*”, limiting the search to practice guidelines in English, published within the last ten years. The initial search yielded seventeen results, seven of which were relevant after examining the abstracts. I limited the search to US guidelines, thus three were relevant. After pulling the articles, I included one in the literature review; two of the articles were variations of the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) guidelines. I found two additional articles through bibliography review.

Articles One & Two Overview:

The United States Preventive Services Task Force (USPSTF) has given an “A” recommendation for lipid screening in men ≥ 35 and women ≥ 45 years of age, signifying that the panel strongly recommends this service because it discovered good evidence that screening improves health outcomes and that benefits outweigh harms.²⁴ The appropriate screening time

frame is uncertain, but other guidelines and experts have suggested every five years, unless risk factors warrant more frequent testing.

In terms of which lipids clinicians should screen for, the task force gave a “B” recommendation for both total cholesterol (TC) and HDL-C. A “B” recommendation means that a systematic review encountered fair evidence for the service. The best predictor of CHD risk is TC and HDL-C screening with Framingham risk calculation, followed closely by TC and HDL-C with NCEP II guidelines, LDL/HDL-C ratio, and TC/HDL-C ratio. Although TC testing alone is also acceptable, it is less accurate. According to the panel, experts consider a TC of 200mg/dL – 239 mg/dL to be borderline high and a TC of 240mg/dL to be high. The recommendations did not mention low HDL-C values.²⁵

The USPSTF acknowledged that CHD is a multifactorial disease, therefore cholesterol alone may not be wholly indicative of risk. The task force also gave a “B” recommendation for screening in men aged 20 to 35 and women aged 20 to 45 with other risk factors such as diabetes, a family history of CHD in male relatives before 50 years of age and in female relatives before 60 years of age, a family history of familial hyperlipidemia, and multiple CHD risk factors.²⁵ The USPSTF systematic review, conducted by Pignone, Phillips, Atkins, et al., also determined that screening for dyslipidemia is both reliable and valid. Taking into account analytic and biological variability, venous blood testing can detect a patient’s TC within ten percent of the actual value, and a patient’s HDL-C within ten to fifteen percent of the true value. Two separate measures ensure this level of consistency, and fasting samples are slightly more accurate than are non-fasting ones. Capillary point of care services have similar reliability. Interestingly, non-fasting HDL-C values are five to ten percent lower than are fasting values.²³

Overall, Pignone, Phillips, Atkins, et al. concluded that drug therapies are effective, testing is reliable, screening is acceptable and feasible, and that the likelihood of identifying persons with dyslipidemia and elevated risk for CHD is high. The slow progression of CHD and the strong link between lipids and the disease make screening appropriate. The most notable harm was mild anxiety from high test results.²³

Articles One & Two Appraisal:

The purpose of the systematic review was to determine if the benefits outweigh the harms for lipid screening and treatment in adults without known cardiovascular disease, based on the effectiveness of treatment and the reliability, accuracy, acceptability, and feasibility of testing. I outline the strength of evidence and grading scales in Table 1. The systematic review increased the validity of the results by accessing a broad scope of the literature and limiting the evidence to RCTs of at least one year's duration and systematic reviews from January 1994 to July 1999.²³ Authors explicitly detailed the methods, search strategies, sources, and inclusion and exclusion criteria. A summary of the design, methods, and outcome measures is listed in Table 1.

The three main studies that the review appraised relating to screening methods were Grover, Coupal, and Hu; Kinosian, Glick, and Garland; and Avins and Browner.²⁶⁻²⁸ These investigations were all secondary analyses that used data from the Lipid Research Clinic, the National Health and Nutrition Examination Survey II, and the Framingham study for a combined n of 11,327 patients with a range of 20 to 74 years of age. The studies came to similar conclusions about which lipids clinicians should screen for. Patient characteristics were not well-defined, however I noted a general, disproportionate number of white males, a population sample that might not be generalizable to PPS's Mexican, mostly female cross-section. Overall, the

systematic review characterized the internal validity of the studies as “good”, however it did not offer an explanation for this assessment.

Article Three Overview:

The Third Report of the NCEP Panel was not entirely consistent with the USPSTF’s findings, recommending a full fasting lipid panel with Low Density Lipoprotein Cholesterol (LDL-C), triglycerides, TC, and HDL-C.²¹ In particular, the review recommended LDL-C as a target based on strong evidence from major RCTs, smaller RCTs, meta-analyses, and observational and metabolic studies. HDL-C also received a recommendation to be followed as a major independent CHD risk factor based on strong evidence from observational and metabolic studies and moderately strong evidence from major RTCs. A full lipid panel may not be financially feasible for small screening programs, however the review conceded that TC alone is also acceptable because it reflects LDL-C levels well.

One strength of the NCEP article is that it details the procedures for measurement as well. Patients should be fasting for nine to twelve hours and must be seated for five minutes prior to testing to avoid hemoconcentration. Preferably, the patient does not have an acute condition such as stroke, trauma, recent surgery, infection, weight loss, or pregnancy that might affect the lipid values. Finger-stick sample collection must be done carefully to avoid tissue fluid dilution.²¹ Unfortunately, the report does not cite any articles or evidence to support these procedures.

An additional discrepancy between NCEP and the USPSTF is that NCEP has recommended screening every five years in adults beginning at age 20 and older, the rationale being that the development of atherosclerosis is a lengthy process that begins early, thus primary preventive measures must commence before the disease inflicts irreparable damage. While the

USPSTF failed to specify cut-off values for HDL-C, NCEP defined low HDL-C as <40 mg/dL in men and <50 mg/dL in women.²¹ The review simply mentioned that cholesterol testing is reliable, but did not go into detail about analytic and biological variance as did the USPSTF.

Because of the potential benefits of primary prevention and the strong link between cholesterol and CHD, NCEP recommended both clinical and population health approaches, emphasizing that screening, risk reduction, and therapy should not be limited to persons who are at high short-term risk. The report outlined the advantages of looking at several risk factors, and detailed the evidence connecting CHD mortality and diabetes, obesity, and hypertension. In particular, NCEP identified CHD risk equivalents, which are co-morbidities that place patients at high risk for acute myocardial events, and general risk factors, which confer high risk if two or more are present in a patient. The review listed prior personal history of CHD, Diabetes Mellitus type II, and other clinical atherosclerotic disease as risk equivalents. General risk factors were a blood pressure of $\geq 140/90$ mmHg or use of antihypertensive medicine, cigarette smoking, low HDL-C, a family history of CHD in male relatives before 55 years of age or in female relatives before 65 years of age, and an age of ≥ 45 years in men and ≥ 55 years in women.

Article Three Appraisal:

The Third Report of NCEP was a systematic review that aimed to define the clinical approach to CHD prevention, focusing on cholesterol testing and management.²¹ The grading scale, which is outlined below in Table 1, was a weakness of the report because it did not include “Recommendation Against” or “Insufficient Evidence” categories as did the USPSTF. Thus, the authors provided no information on harmful practices or areas of research that need more investigation.

NCEP included major RCTs, smaller RCTs, meta-analyses, observational studies, and metabolic studies in its systematic review. As I mention in Table 1, the authors gave a very brief description of search methods, indicating MEDLINE as the only source. Although the drug outcome tables were extensive and the review cited over 1000 articles, I wondered why they mentioned searching only one database for such a multidimensional topic, as many relevant articles are not necessarily documented in MEDLINE.

The report used numerous studies to craft its recommendations, however one drawback was that most of the studies were related to the effectiveness of therapy and the link between lipids and CHD. The review did not compare and contrast screening methods. Recommendations for cholesterol screening were based mainly on the Framingham Heart Study, in particular the cohort studies Wilson, D'Agostino, Levy, et al. and Lloyd-Jones, Larson, Beiser, and Levy.^{29, 30}

Wilson, D'Agostino, Levy, et al. followed 2489 men and 2856 women aged 30 to 74 for twelve years, and Lloyd-Jones, Larson, Beiser, and Levy followed 2420 men and 2895 women aged 40 to 94 for 109,908 patient-years, prospectively from their 1971-1975 baseline Framingham examination. Wilson, D'Agostino, Levy, et al. examined the link between risk factors and the development of CHD, measured by Framingham clinic regular examination and outside medical records, while Lloyd-Jones, Larson, Beiser, and Levy used three physicians to check medical records and death certificates to determine the lifetime risk of angina pectoris, coronary insufficiency, myocardial infarction, and death from coronary heart disease for different age and risk categories. Differential measurement bias could be present if doctors checking medical records were unmasked and knew that patients were participating in the Framingham study. Another issue is that the report presented the evidence for cholesterol screening, but did not review how the authors concluded that the evidence was legitimate.

Table 1: Article Appraisal

Author	Study Design and Methods	Outcome Measures	Strength of Evidence
USPSTF, Pignone, Phillips, Atkins, et al. ^{23, 25}	<ul style="list-style-type: none"> + Systematic Review with broad scope of literature. + Detailed description of the key questions, search methods, and sources (MEDLINE and Cochrane.) + Well-defined inclusion and exclusion criteria. + Benefits and harms were specified and quantified. + Authors listed the excluded papers and cited reasons for exclusion such as non-randomized studies, inadequate follow-up time, and secondary prevention studies. - Did not list baseline characteristics of studies. 	<ul style="list-style-type: none"> + Direct clinical outcomes: total mortality, CHD mortality, and non-fatal MI. + Intermediate outcomes: lipid levels, reliability of tests + Indirect outcomes: cost-benefit analysis. 	<ul style="list-style-type: none"> + The USPSTF used a three tier evidence grading scale and an A-I recommendation scale. + Limited evidence to RCTs of one year's duration. - Judged the overall internal validity of the findings as "good", but did not detail trial-specific internal and external validity or potential biases. - Results may not be generalizable to Mexican population, as the studies had an over-representation of white males.
NCEP ¹¹	<ul style="list-style-type: none"> + Systematic review drawing from over 1000 articles. + Benefits and harms were specified and quantified. - Very brief description of search methods, indicating sources (MEDLINE) - Neglected to state inclusion and exclusion criteria or the time period that the search drew from. - Did not list baseline characteristics of studies. - Neither review nor specific studies detailed confounders. 	<ul style="list-style-type: none"> + Direct outcomes: CHD morbidity and mortality and coronary event rate. + Intermediate outcomes: lipid levels. + Indirect outcomes: cost analyses, harms, and benefits. - In main studies, doctors possibly unmasked while measuring outcomes. 	<ul style="list-style-type: none"> + NCEP used a three tier grading scale for supporting evidence study design and an A-D strength of evidence scale. + Limited evidence to major RCTs, smaller RCTs, meta-analyses, observational studies, and metabolic studies. - Judged the overall internal validity of the findings as "strong", but did not detail trial-specific internal and external validity or potential biases to support this assertion. - Results may not be generalizable to Mexican population, as the studies NCEP used did not examine race.

Applicability to PPS:

Currently, PPS is following USPSTF guidelines, but is not entirely aligned with NCEP's more stringent requirements. For financial reasons, PPS cannot comply with NCEP's

recommendation of a full lipid panel, however both guidelines seem to agree that TC and HDL-C capillary point-of care screening with a risk factor assessment is effective. As outlined by the USPSTF, the Framingham risk calculator, and NCEP guidelines, PPS accounts for all major CHD independent risk factors. Some issues are that program planners have not yet identified an appropriate screening interval, and that the PPS age cut-off of 30 years for men and women is not consistent with USPSTF and NCEP recommendations.

Effective Cardiovascular Screening Methods in Mexico

My second key question was: In cardiovascular screening programs that have been implemented in rural Mexican populations, what are the screening methods used? Articles detailing cardiovascular screening methods in Mexico were hard to find. Because I was interested in the particulars of Mexican community screenings, I chose to look at cholesterol research in Mexico and examine the methods sections.

Search Strategy:

I searched PubMed with the MeSH terms “Cholesterol AND Mexico AND Rural”, limiting the search to English and Spanish language and human subjects. This method yielded fifteen results, five of which were relevant. After reviewing the abstracts, two met my inclusion criteria of cholesterol testing in a rural Mexican adult population, including both men and women. I discarded one of the original five articles because it did not include women, one because it had the same methods and sample population as one of the other articles, and one because it was published in a journal that I did not have access to. I googled “Cholesterol

screening AND rural Mexico”, as well as reviewed the bibliographies of the two articles, but did not find any additional manuscripts that fit the criteria.

Article One: Aguilar-Salinas, Lerman-Garber, Pérez, et al.: ³¹

The purpose of this comparative cross-sectional study was to determine the prevalence of dyslipidemia and its association with nutrition in rural and urban elderly Mexican populations of varying socioeconomic status. The article was published in 2001, but the researchers failed to include the date of the data collection, an important piece of information considering that they mention the upward yearly trend in CHD risk factors in Mexico. That pattern, coupled with annual migratory changes, could alter the results.

Source and sample population characteristics are listed below in Table 2. Inclusion criteria were residence in the site community for more than five years, independent ability to understand and answer questions, and ≥ 30 years of age. Excluded persons included institutionalized patients and individuals with dementia, acute illness, or memory problems.³¹

Excluding institutionalized persons and those with acute illness was appropriate because, as the literature review of practice guidelines showed, surgery, illness, and dietary changes can alter lipid profile. Likewise, persons with dementia or memory problems would have difficulty self-reporting data accurately. However, potential selection bias is present because researchers did not explain how they assessed “memory problems”; for example, if the people selecting participants were also judging lucidity and memory, they might be more likely to exclude obese individuals in rural areas if they believed that rural dwellers should have healthier diets and lower cholesterol. Additionally, the selection process excluded the homeless and workers who frequently migrated, thus the sample may not be fully representative of the Mexican population.

The researchers selected the sites using what they called “standardized rapid appraisal procedures”, choosing geostatistical areas that represented the rural, poor urban, and middle class urban national averages in health facilities and community services. Investigators recruited participants from their homes based on random sampling from census data. The paper did not elaborate on how the randomization was conducted, allowing for potential selection bias.

Seventy-eight percent of the urban and 85% of the rural persons who were invited agreed to an interview, while 60% of those interviewed gave blood samples for testing. Although the authors claimed that the characteristics of those who did not undergo blood sampling were very similar to the traits of those who did, they did not include a characteristics table supporting this assertion and did not list the percentages of participants from rural versus urban groups. Unequal participation among age and geostatistical groups might affect results. Thus overall, selection bias was likely high.

The study used a local primary care facility to examine venous blood for TC, HDL-C, LDL-C, triglycerides, very-low-density lipoproteins, and glucose. Researchers conducted home visits and measured blood pressure, height, weight, waist and hip ratios, BMI, skin-fold thickness, and arm muscle circumference. Aguilar-Salinas, Lerman-Garber, Pérez, et al. struggled with measurement bias because the personal interviews on demographic, socioeconomic, personal and family medical history, lifestyle factors, and 24 hour dietary recall were self-reported.

The results of the study are listed in Table 2. The investigation revealed a high prevalence of hyperlipidemia among all of the elderly sub-groups. High fat and carbohydrate diets were more associated with elevated lipid values, however the researchers appropriately did not draw causal relationships, acknowledging that cross-sectional data cannot prove causality and that the variations involved in a single lipid measurement make results less accurate. Although the study

had fair to poor internal and external validity, the methods and results are significant because the rural sample of mostly adult Mexican women is comparable to the PPS study population.

Article Two: Echavarría-Pinto, Hernández-Lomelí, Alcocer-Gamba, et al.:¹⁴

The purpose of this cross-sectional study was to determine the prevalence of the Metabolic Syndrome in adults aged 20-40 years in a rural Mexican community. Population information is listed in Table 2. Exclusion criteria were unwillingness to participate in the study and missing two or more home appointments. Although 73 would seem to be a small and arbitrary sample size to properly approximate Metabolic Syndrome prevalence, the researchers claim that statistical testing revealed that a sample size of 70 or more would be acceptable.

Although the authors did not clarify how they chose this village, they did describe their randomization strategy. They used simple randomization by alphabetizing the local health center's age-eligible patient roster and sending written invitations to every nth patient. Eleven point four percent did not respond, and 25.7% missed their appointments more than twice, combining for an overall non-response rate of 37.1%. The potential for selection bias is high; the large number of people who did not respond might have been different in some way from those who did reply. In addition, the study was not able to include patients who were not in the health center directory and many persons who could not read. The issue is substantial because this population's literacy is low.¹⁴

Some measurement bias may have been present in the self-reporting of family history and tobacco use. Investigators made appointments with groups of ten participants; asking a set of interview questions; measuring abdominal circumference, height, weight, and blood pressure; and extracting a nine to twelve hour fasting venous blood sample to be transferred to the nearest

city laboratory and analyzed for HDL-C, triglycerides, TC, and glucose. The study determined that the prevalence of the Metabolic Syndrome was elevated among the participants at 45.2%. Full results are listed in Table 2. Although Echavarría-Pinto, Hernández-Lomelí, Alcocer-Gamba, et al. had fair to poor internal validity due to selection bias, and therefore had mediocre external validity as well, the study population has fair to good generalizability to the PPS participants.

Table 2: Article Overview

Author	Study Design	Location	Population and N	Results
Aguilar-Salinas, Lerman-Garber, Pérez, et al. ³¹	2001 cross sectional comparative study.	The middle class Mexico City section of Centro Urbano Presidente Aleman, the lower-income Mexico City section of Colonia Isidro Fabela, and a rural area of Temascalcingo, Mexico.	Source population: 196 men and 316 women aged ≥ 60 years, and 180 men and 290 women aged 30 to 59. Sample population: 121 men and 233 women aged ≥ 60 years, and 93 men and 180 women aged 30-59 who agreed to give a blood sample.	Rural elderly men TC: 5.02 ± 0.97 mmol/L (approximately 194.28 mg/dL) Rural elderly women TC: 5.50 ± 1.10 mmol/L (approximately 212.85 mg/dL.) Urban middle-income elderly lipids were higher than rural and urban low-income groups: Men TC: 5.60 ± 1.07 mmol/L (216.72 mg/dL) Women TC: 5.90 ± 1.10 mmol/L (228.33 mg/dL)
Echavarría-Pinto, Hernández-Lomelí, Alcocer-Gamba, et al. ¹⁴	2004 cross sectional study.	The village of Senegal de Palomas, Querétaro, Mexico.	Source and Study population: 31 men and 42 women between the ages of 20 and 40 years old	Prevalence of the Metabolic Syndrome: Men: 48.4% Women: 42.8% Overall: 45.2 % (95%CI 34.8 - 58.6 %). Low HDL-C: Men: 93.5% Women: 90.5%

Applicability to PPS:

Many of the clinical measurements were similar between PPS and Aguilar-Salinas, Lerman-Garber, Pérez, et al., except that Aguilar-Salinas, Lerman-Garber, Pérez, et al. took

blood pressure readings with an electric sphygmomanometer in the supine position, conducted home visits, and had patients don a gown. The gown increased the accuracy of anthropometric measurements, but may be considered an invasion of privacy and is not appropriate for PPS mass screenings in the churches. Researchers also measured skin-fold thickness and arm muscle circumference, as well as included a 24 hour dietary recall. PPS may consider incorporating 24 hour dietary recalls, however adding this measure may prove difficult and unnecessary, especially considering the evidence that self-reporting bias may render this tool less useful.³²

Another divergence is that although Aguilar-Salinas, Lerman-Garber, Pérez, et al. gave medical treatment to those in need, they did not follow-up with the patients beyond the single intervention. Their main goal was to conduct a cross-sectional measurement of lipids in different geostatistical areas, yet PPS's mission is to create a longer term intervention and maintain a continual presence in the communities. Therefore, PPS must approach its research as a secondary objective, placing the community needs first.

Echavarría-Pinto, Hernández-Lomelí, Alcocer-Gamba, et al. also had discrepancies with PPS, however of note are the similarities between the two study populations. PPS does equivalent screenings among a comparable rural population less than 100 miles from Querétaro. The article mentioned that 52.7% of Senegal de Palomas worked in agriculture and 58.5% had a primary school education.¹⁴ PPS has a similar distribution working in agriculture, and approximately 79% of program participants surveyed in 2006 had a primary school education or less.³³ Interestingly, the 2006 PPS patients had lower education levels, perhaps because our program relies on word of mouth and not written invitations. Because Echavarría-Pinto, Hernández-Lomelí, Alcocer-Gamba, et al. used randomization and written invitations in their recruitment strategies, the two populations are not entirely analogous.

Although PPS shares many similarities with the two reviewed studies, recruitment strategies and cholesterol lipid methods were dissimilar. Both Echavarría-Pinto, Hernández-Lomelí, Alcocer-Gamba, et al. and Aguilar-Salinas, Lerman-Garber, Pérez, et al. used NCEP guidelines to frame their cholesterol testing. In the USPSTF's review, the authors explained that NCEP guidelines are perhaps the most difficult and least patient-centered screening methods.²⁵ Therefore, although PPS concurs with NCEP in some areas, the program prefers to follow less stringent, more population-feasible methods for cholesterol screening, a strategy that is supported by the USPSTF.

Both studies used a randomization strategy in recruitment, while PPS uses a convenience sample. Although proper randomization should decrease the likelihood of selection bias and confounders, a convenience sample is more applicable to population-based interventions in that it does not deny care to those who might seek screening. The problem that PPS faces is that the internal validity of the program's research is not as robust as it could be if PPS were to use randomization in sampling and rigorously follow NCEP guidelines. PPS can examine this dilemma further, but must make certain that changes to the research design do not compromise the patient population in any way.

Program Plan

The program planners designed Proyecto Puentes de Salud to be a service, research, and Spanish immersion project that addressed an expressed need of a disadvantaged population. Cardiovascular screenings in the rural Mexican communities are appropriate because 1) diabetes and cardiovascular disease are the top two causes of mortality in JR in 2006; 2) the communities have articulated a desire to have cardiovascular screenings; 3) researchers have shown screenings to be effective because the disease has a slow progression and the risk factors are modifiable; and 4) the rural villages of JR have access to care barriers that prevent them from easily obtaining medications and regular health checks.^{6, 21, 23, 24, 34}

Proyecto Puentes de Salud Mission:

The mission of Proyecto Puentes de Salud is to improve the cardiovascular health of rural JR communities by providing free cardiovascular screenings and counseling, increasing health knowledge, encouraging community empowerment, inspiring behavioral change, and expanding access to care. PPS will serve as a “health bridge” between underserved Hispanic communities and needed health service to ameliorate health care inequalities. The project will also prepare future doctors for public service by developing leadership, cultural competency, clinical and research skills, and Spanish language competency.³⁵

Program Context

Proyecto Puentes de Salud implements cardiovascular screenings in the central farming plains of Juventino Rosas, Mexico. This region has an array of political, social, and economic

factors that influence the delivery of healthcare and shape the local beliefs and behaviors towards cardiovascular disease.

Political Context:

Mexico is a federal republic with a bicameral legislature and an authoritarian system governed by the president, who is elected every six years by majority vote.³⁶ In 2006, Juventino Rosas elected Partido de Acción Nacional (PAN) candidate Juan Antonio Acosta as the municipality president. Juan Acosta has fully backed PPS, donating his car and house to the project, featuring PPS in the local newspaper, and presenting the 2006 members with the key to the city.³⁷

Likewise, the Roman Catholic Church of Santa Cruz de Juventino Rosas supports the project and has a nine member delegation responsible for finding housing and food in JR and the smaller communities for all the American volunteers. In conversation, the rural communities have expressed greater trust in PPS because of Church involvement.⁶ As 96.3% of the Juventino municipality residents are self-professed Roman Catholics, the church has a strong political hold over the surrounding area.³⁸ The church and state share and compete for power, therefore tension exists between the local government and the religious leaders that date back to the 16th century.³⁶ However, these strains have not had a noticeable effect on PPS productivity.

In addition, stricter enforcement of US immigration laws may alter the locals' perceptions of the American-based PPS project. Federal courts have recently begun to rule against illegal immigrants, enacting harsh penalties against businesses that employ illegal workers. According to the National Conference of State Legislatures, in 2007 1,562 immigration

bills were proposed in Congress and 244 became law.³⁹ The more stringent US stance on immigration could negatively influence PPS community relations.

Economic Context:

In 1993, Mexico joined the North American Free Trade Agreement (NAFTA), eliminating many tariffs and liberalizing trade between the United States and Mexico. Although NAFTA created approximately 5.3 million jobs, 1.3 million agricultural workers, mostly small rural corn and bean farmers, lost their employment. The majority of the new jobs were in manufacturing.⁴⁰ Unable to compete with tax-free imports from the US, the rural farmers in Mexico suffered large financial blows; poverty in the agricultural sector rose from 54% in 1989 to 64% in 1998. Many workers immigrated to the US to seek financial stability.⁴¹

The communities surrounding Juventino Rosas rely heavily on corn farming for survival.³⁸ If the locals are struggling to subsist, they may be less concerned with cardiovascular health, have less time to attend health screenings, and be less likely to pay for continued doctor visits and medications. Additionally, if food and water shortages are common, families may be unable to positively alter their lifestyles and diets; fruits and vegetables are generally more costly than unhealthy alternatives, and villagers must expend valuable time and money traveling to Juventino Rosas to purchase these items.

Social and Environmental Context:

In talking to doctors and patients in the Juventino area, PPS medical students have discovered that one cultural barrier to healthcare is a fatalistic attitude towards death; community members are not concerned about their health because they believe that God is responsible for

their well-being and will either cure them or raise them to heaven. Additionally, a sense that one is not sick unless one feels pain or is unable to perform daily activities is pervasive among the villagers. Chronic illnesses such as diabetes, hypertension, and obesity in which the patient does not necessarily feel ill, are often never diagnosed because the person will not spend money on a seemingly unnecessary checkup. Machismo comes into play here as well, as men do not like to be considered weak and avoid medical attention as long as they are still able to work.^{6, 9, 42, 43}

Other social factors work against PPS project success. High migration rates of working men may lead to increased depression among Mexican women.^{44, 45} Studies have demonstrated that the PHQ-9 Questionnaire is a reliable screening tool for Hispanic patients.⁴⁶ In a sample of 432 patients that PPS volunteers screened for depression with the Evaluation of Mental Disorders Brief Patient Health Questionnaire (PHQ-9), 25.9% scored in the moderate to severe depression category.⁴⁷ Dealing with depression could prevent women from attending screenings or caring to alter lifestyle behaviors.

Environmental factors could also affect project implementation. PPS conducts screenings during the months of June and July, during the Mexican rainy season. Most farmers plant crops in this time period, and the increased workload could prevent them from attending screenings.

Health Care Context:

In 2001, Mexican President Vicente Fox and Minister of Health Julio Frenk initiated a massive reformation of the healthcare system, incrementally enrolling citizens in the government-run universal health care, Seguro Popular. The reaction to the new system has been mixed. In 2000, 55% to 61% of the Mexican people were without health insurance. The government has preferentially targeted the rural poor and as of 2006, has enrolled 11.5 million

persons in Seguro, with 40% of these enrollees coming from the bottom two income deciles.⁴⁸

One arm of the program, Oportunidades, is lauded by the communities; it provides free health services and prenatal care as long as participants show up to weekly health education sessions.⁴⁹

However, in interviews, local Juventino residents and doctors have explained some of the deficits of the new system. Many fundamental medications, such as metformin, are not in the basic formulary, despite the number one cause of mortality in the municipality being diabetes.³⁴ Wait times for clinic visits and surgeries are long, especially for farmers who have to halt work to travel to appointments. The local Secretary of Health and Education spends the annual health budget of \$10,000 US on building structures instead of equipment and medications. Private practice physicians feel that the universal healthcare system has deprived them of patients and taken some of their business; they may be less likely to devote time to PPS if they are concerned with their stagnating profit margins.^{6, 9, 10}

Program Theory

Program theory can aid in understanding the broader contexts and barriers affecting program implementation, can provide a realistic description of behaviors that the planners will encounter, and can suggest methods for changing behavior on an individual and a community level.⁵⁰ The ecological perspective is a multilevel tactic in program theory that examines a person's relationship with his or her environment, taking into account the social and economic policies, institutions, neighborhoods and communities, living conditions, interpersonal relationships, and individual risk factors and beliefs that shape behavior.⁵¹ PPS employs this multifactorial approach to program theory; in light of the contexts that influence the project, the

two models that describe PPS best are the Community Organization theory and the individual Health Belief Model theory.

Community Organization theory includes empowerment, community capacity, participation, relevance, issue selection, and critical consciousness. A 2007 UNC lecture reveals an example of Community Organization theory in a program that is similar to PPS. The program is an African church-based cardiovascular screening and intervention project. The project created local task forces to brainstorm and manage interventions, fostering empowerment, participation, and community competence of the local village. Issue selection focused on winnable, easily measureable outcomes such as risk factors.⁵⁰

Likewise, PPS has helped construct several local teams to allow the JR residents to take control over their own health: the Mexican church delegation and a group of doctors. However, a task force that includes the patient population does not exist, and the creation of one could greatly enhance empowerment. Yearly surveys of all screened patients accomplishes relevance and participation, allowing over 2000 people to give feedback on what health screenings are most important to them. Similar to the African Program, PPS has selected modifiable cardiovascular risk factors as quantifiable issues. PPS could improve in critical consciousness; health education techniques thus far have attempted to engage the audience and foster community discussion on how to combat cardiovascular risk factors, yet medical students have not received the formal health education training to coordinate or encourage these conversations.

The Health Belief Model is an individual level theory with the constructs of perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. For people to initiate change, they must believe that they are susceptible to a disease and that inaction will produce an unfavorable outcome that could have been avoided through

action. They must believe that the barriers to change are surmountable and that they have the ability to succeed.⁵¹ Simply telling a person what to do without acknowledging his or her prior conceptions reduces the chance that an intervention will work.¹⁹

Considering the social contexts and ingrained local beliefs about health, this model is critical to PPS's ability to inspire lifestyle change in the individual. PPS patients have difficulty understanding that chronic diseases such as diabetes and hypertension often do not have symptoms; a large component of our health education is focused on explaining the importance of regular screenings and taking medication even when symptoms are not present. Since many patients have a relative with diabetes, we can use personal experience to demonstrate the frequency of the disease and the lack of symptoms.

One construct of the Health Belief Model that the project could improve is the perceived barriers. Real obstacles that are commonly cited by participants include the economic costs of healthy food and healthcare and the difficulties involved in traveling to see the doctor.⁶ Although PPS has begun to address some of these issues, the current project referral system may not offer enough assistance to ensure that participants can overcome the barriers to access doctors and medication.

Program Goals and Objectives

Proyecto Puentes de Salud Program Goal:

The Goal of Proyecto Puentes de Salud is to improve cardiovascular health in the rural communities of Juventino Rosas, Mexico by maximizing community recruitment and participation, by increasing the effectiveness of screening implementation and community health education, and by improving follow-up and access to medications and doctors.

Short-term Objectives:

- 1) Within one year, PPS planners will involve all stakeholders in goal setting and planning cycles by drafting, testing, and administering reliable implementation surveys for volunteers and patients.

Strategy:

- a) In 2008, PPS leaders will conduct focus groups to obtain volunteer feedback and use the focus groups to tailor the surveys.
 - b) PPS will help form community task forces to increase local empowerment.
- 2) Within two years, PPS planners will make screening implementation and health education talks (known as “Charlas”) standardized, measurable, and structured to amplify the effectiveness of the interventions.

Strategy: In 2008 and 2009, PPS leaders will draft a screening protocol and put in place measurable indicators.

- 3) Within one year, PPS first year medical students will add patient identifiers to the IRB to track patient follow-up.

Strategy:

- a) PPS students meet with advisor for guidance on IRB proceedings.
 - b) PPS students submit addendums to the IRB.
- 4) Within one year, PPS planners will improve the referral system with local doctors to track continued patient care and medications.

Strategy:

- a) In summer 2008, PPS planners will meet with local doctors and lay health workers to discuss preferred and most effective referral practices.

- b) In summer 2008, PPS planners will double the number of local referral physicians from three to six. One referral physician will be present in the community for each screening day.
 - c) In summer 2008, PPS will initiate a new referral system that has the ability to account for all referred patients' initial physician visits and subsequent visits.
- 5) Within one year, 100% of medical students will have undergone health education training, gaining knowledge and skills.

Strategy: In 2008, PPS leaders will design health education classes.

Long-term Objectives:

- 1) Within five years, 90% of referred patients will be seen by local doctors for follow-up.
- Strategy:* Doctors and students use new referral system and continue to communicate and discuss potential barriers.
- 2) Within five years, PPS will observe measurable changes in cardiovascular knowledge and lifestyle practices among the rural community members.

Strategy:

- a) Volunteers continue to use measurable indicators, standardized screening, and health education training.
 - b) Community task forces lead discussions examining barriers to improved cardiovascular health.
- 3) Within ten years, PPS will observe measurable improved community cardiovascular health.

Strategy: All stakeholders communicate and accept the standardized system.

Implementation Plan

Proyecto Puentes de Salud Program Goal:

The Goal of Proyecto Puentes de Salud is to improve cardiovascular health in the rural villages of Juventino Rosas, Mexico by maximizing community recruitment and participation, increasing the effectiveness of screening implementation and community health education, and improving follow-up and access to medications and doctors.

Main Objectives:

- 1) Improve cardiovascular knowledge and encourage lifestyle change among rural community members living in the Juventino Rosas, Mx municipality.
- 2) Improve access to care in the communities surrounding JR by involving doctors and strengthening the referral system.
- 3) Improve cardiovascular health in the communities surrounding JR.

Activities to Accomplish Objectives:

- 1) Coordinate with Juventino Rosas Church, government, and health system to tap into local infrastructure.
- 2) Coordinate with local community leaders to determine which health needs are unmet, feasible to address, and desired to be met.
- 3) Conduct screenings and health education talks, or “Charlas”, in communities.
- 4) Meet with local doctors to alter the referral system and to measure the continuity of care.

Table 3: Specific Activities Monthly Administrative Timeline

<i>Activity</i>	<i>Staff</i>	Sept 2007	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Recruit MS1s	MS2	X	X	X									
Applications due, Applicants chosen	MS1, MS2			X									
Hold meetings	MS2	X	X	X		X	X	X	X	X			
First grant due	MS1				X								
Research topic chosen	MS1				X	X							
Grant writing/ IRB	MS1				X	X	X	X					
Research Ethics/ Methods training	MS1, Research advisor					X	X						
Clinical Skill training	MS1, MS2, Advisor					X			X				
Charla training	MS1, MS2, LAHI								X				
Recruit UNC/ Duke MDs, Set MD Schedule	Designated UNC MD				X	X	X	X					
Class credit	MS1							X					
Finalize schedule	MS1							X					
Choose communities	MS1, Delegation								X				
Order materials	MS1									X			
Print supplies	MS1										X		
Obtain room & board	Delegation									X			
Obtain Transportation	Local govt., Delegation									X			
Meet with Delegation, local govt., local MDs & Health Dept.	Local govt., Delegation, Local MDs, MS1									X	X		
Spanish language school	MS1									X			
Recruit participants	MS1, Delegation										X	X	
Run Screenings	MS1, MDs										X	X	
Give CME talks	UNC MDs										X	X	
Give Charlas	MS1										X	X	
Enter data	MS1										X	X	X
Analyze Data	Statistician												X
<i>Activity</i>	<i>Staff</i>	Sept 2008	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Write abstracts	MS2	X	X	X									
Poster/conference presentations	MS2				X	X	X	X	X				
Write papers	MS2, MS3							X	X	X	X	X	X

Specific Activities Weekly Administrative Timeline

May 19-30	Spanish Language School
June 2-6	Organization Week
Sun June 8	<u>Delegation introduces students</u> to community at Catholic mass; recruiting
Mon June 9 - Wed 11	Group 1 in Community 1, Group 2 in Community 2 Screenings 7am - 2pm, Charlas Tues/ Wed 6pm - 7pm
Thurs June 12 - Fri 13	Data entry, organize supplies for next week
Fri 13 – Sat 14	Free time
Mon June 15 – Fri Jul 18	Similar screening/ organization pattern as outlined above 10 communities visited
Sat Jul 19 – Sun Jul 27	Travel in Mexico; fly back to US

Table 4: Detailed Budget

<i>Resource</i>	<i>Already purchased</i>	<i>Source</i>	<i>Individual Cost In \$ US</i>	<i>Total 2008 Costs</i>
<i>Screening Equipment:</i>				
4 Blood Pressure cuffs	X	Online vendor	35.00/ea.	-
6 Glucose Monitors	Need 2	CVS	85.00/ea.	170.00
1000 Glucose strips		CVS	1.00/ea.	1000.00
450 Capillary tubes	X	Doctor Donated	0.50/ea.	-
600 Gauze, 600 alcohol wipes		CVS	4.00/100	48.00
500 Band-Aids		CVS	8.79/250	17.58
3000 Gloves		Online vendor	59.99/1000	179.97
450 Cholestec panels	X	Doctor Donated	10.00/ea.	-
2 Cholestec Machine, 4 extension cords	X	Doctor Donated	1500/ea., 8.00/cord	-
2 Scales	X	Store in Mx	10.00/ea.	-
2 Meter Stick	X	Store in Mx	4.50/ea.	-
6 BMI Measuring Tape	X	Online vendor	10.00/ea.	-
6 Stethoscopes	X	Student owned	125.00/ea.	-
500 Patient Folders with 500 patient stickers		Staples	29.00/100	145.00
4 File Boxes	X	Wal-Mart	5.00/ea.	-
500 Recruitment Flyers, 2 Banners	Need Flyers	Mx print store	.05/ea.	25.00
<i>Questionnaires:</i>				
450 HRAs		Mx print store	.05/ea.	22.50
450 Supplementals		Mx print store	.05/ea.	22.50
1000 Patient Values paper		Mx print store	.05/ea.	50.00
500 Referral paper		Mx print store	.05/ea.	25.00
<i>Health Education:</i>				
600 education flyers		Mx print store	.05/ea.	30.00
600 education quizzes		Mx print store	.05/ea.	30.00
6 education packets		Mx print store	.05/ea.	30.00
Demonstration Food		Mx market	20.00/week	500.00
2 Diabetes props, 2 Cholesterol props		Mx market	5.00/ea.	20.00
4 Poster boards		Mx grocery	0.50/ea.	2.00
6 Markers, 12 pens	X	Student owned	0.50/ea.	-
4 Rolls Masking Tape	Need 2	Wal-Mart	1.50/ea.	3.00
10 Info Packets for Community Casas de Saud		Mx Print Store	1.00/ea.	10.00
<i>Organization:</i>				
Phone calls		Mx Tienda in US	5.00/phone card	40.00
Stamps		USPS store	.67 or .41/ea.	10.00
Photocopies		Library	Free	-
Recruitment Food		Cosmic Cantina	100.00/meeting	200.00
<i>Focus Groups:</i>				
2 US, 2 Mx Moderators			16.00/hr/moderator	576.00
Travel, room, board in Mx		Bus, Delegation host	2400.00	240.00
Food for 6 groups		Delegation host	90.00	90.00
Recording Equipment, tapes	X	Dept. Fam Medicine	25.00	25.00
6 Printed protocols	X	Library	Free	-
Transcription costs		Det. Fam Medicine	1000.00	1000.00
<i>Volunteers:</i>				
10 Doctors: Travel, room, board in Mx	X	Doctor pays	Plane ticket 450.00	-
6 Students: Travel			20.00/day X 7 days	-
Food			Plane ticket 450.00	2700.00
Transportation & Housing		Delegation	5.00/day X 60 days	300.00
Training (speaker fees, food)	X	Local govt. donated	20.00/wk gas	160.00
		LAHI funds	150.00/session	600.00
<i>Total:</i>			22,016.55	8,271.55

Organizational Structure

The infrastructure that PPS works within is largely based on the Catholic Church of Santa Cruz de Juventino Rosas; the Church provides the facilities, volunteers, and ensures the trust of the community. PPS medical students run the screenings and hold health talks in the community parish during June and July. The Delegation, an organization of PPS Church volunteers, introduces the students at mass, coordinates housing, food, and transportation, and helps choose communities each year. Medical students and Church volunteers selected the fifteen communities in 2006 and 2007 based on a US migration rate of 60% or more, limited access to health care due to geographic location, and population size between 200 and 5,000 persons.⁴⁷

The PPS staff includes more than 50 volunteers in two years. In 2006, this volunteer pool consisted of four MS1s, two undergraduate students, seven doctors and faculty, four family members, and five Delegation members. In 2007, the volunteers included three MS1s, three undergraduates, twelve faculty and doctors (eight new), the UNC Dean of Student Affairs, six family members, and six additional Delegation members. Six MS1s have joined the project for 2008. Prior to the screenings, PPS coordinated a loose network of local doctors to receive and manage at-risk referrals. Three doctors currently serve as the main referral avenues.

Participating Clients and Recruitment

PPS planners designed the cardiovascular screening program to reach adult Mexican men and women living in the rural communities within a 30 mile radius of Juventino Rosas. Inclusion criteria for research purposes includes being of Hispanic ethnicity, natives of Mexico, residents of Guanajuato, and over the age of 30. In particular, the screening targets men older than 35 and women older than 45, in accordance with USPSTF guidelines.⁵²

Thus far, PPS has screened over 2000 individuals and included 699 people in the research component of the program. Eighty-two point seven percent of participants were women. The high percentage of women was partially due to cultural norms, high migration rates, and PPS holding screenings during the planting season. With a mean of 46.5 years, the participants have been younger than we had hoped, likely due to cultural norms and age-specific responsibilities in the communities. Yearly PPS screening goals are 1000 individuals for general screening and more than 200 for research purposes. Recruitment consists of invitations over loudspeakers, the distribution of flyers throughout communities, and weekly announcements at the Catholic masses.

Screening Methods

Interviews:

First Year Medical Students obtain IRB approval from UNC-CH and verbally consent participants. The trained, bilingual students interview each participant face to face using a standard evidence based *El Perfil de Bienestar* survey. This 39 multiple choice questionnaire covers demographic information, past medical history, family history, dietary and lifestyle behaviors including physical activity, tobacco and alcohol use, and social and psychological health. Investigators supplement this risk appraisal with a secondary form that focuses on family composition, migration history, education level, medications, and access to care and insurance.

Vitals, BMI, and waist-hip measurement:

The medical students assess clinical measures, recording weight (lbs) using two identical calibrated scales, height (inches) using a fixed measuring stick, waist and hip measurements (inches) using measuring tape, Body Mass Index (BMI calculated as $(\text{lbs}/\text{inches}^2) \times 703$), and one

blood pressure reading per arm using a blood pressure cuff and stethoscope, recording the mean of the two blood pressures. Patients remove shoes for height and weight measurements. To determine waist to hip ratios, students measure waist halfway between the lower rib margin and iliac crest and hip circumference at the widest part over the greater trochanters.

Vitals, BMI, and waist-hip diagnostic guidelines:

Students record abdominal obesity as a waist to hip ratio > 0.85 in women and > 0.90 in men.⁵³ Research has shown that waist-hip ratio is equally, if not more, predictive of coronary heart disease than BMI, therefore the PPS team assess this measure as well.⁵⁴⁻⁵⁷ In accordance with the Adult Treatment Panel III (ATPIII) guidelines, we define overweight as a BMI ≥ 25 and obese as BMI ≥ 30 . We consider average blood pressures between 121/81 and 139/89 mmHg as pre-hypertension, between 140/90 and 159/99 mmHg as stage 1 hypertension, and $\geq 160/100$ mmHg as stage 2 hypertension.¹¹

Cholesterol and glucose measurement and diagnostic guidelines:

In a private room, the trained medical students draw one blood sample per patient in a capillary tube and run samples in the Cholestec LDX® system to obtain fasting (> 8 hrs) blood glucose, total cholesterol (TC), and high density lipoprotein cholesterol (HDL-C), all recorded in mg/dL. In accordance with American Heart Association and ATPIII statements, we define elevated TC as > 200 mg/dL and low HDL-C as < 50 mg/dL for females and < 40 mg/dL for males. Impaired fasting glucose is a glucose > 100 mg/dL. We define the Metabolic Syndrome as impaired fasting glucose plus two of the following criteria: blood pressure $\geq 130/85$ mmHg, HDL < 40 mg/dL for men or < 50 mg/dL for women, and a waist circumference of > 102 cm ($>$

40 in) in men and > 88 cm (> 35 in) in women.^{11, 58} Medical students provide results and counseling on site, immediately following interviews and lab procedures. The process duration averages one hour per participant.

Referrals

In 2006, the referral network consisted of Dr. Narveis, and the Juventino Rosas public Centro de Salud. Students gave participants with high values Dr. Narveis's contact information and address, as well as bus fare. The project did not have a cut-off for dangerously high values; however, students used clinical discretion to decide which results warranted a home visit to the patient by Dr. Narveis, who was able to prescribe medicine immediately.

In 2007, a similar network and referral system existed, with Drs. Narveis, Sanchez, and Carolina fielding all referrals. In conversations with PPS leaders that year, villagers explained that taking a bus to Juventino also signifies lost money in terms of time away from work. Therefore, in spite of the PPS bus fare, villagers may not tap into the referral system.⁶ Dr. Carolina was on-site with the students for several days to provide immediate counsel; in the coming summers, this set-up may circumvent some of the access problems. To improve the effectiveness of follow-up in the future, the 2008 PPS planners have begun to extensively evaluate the referral system.

Future Program Improvement

As discovered in the preliminary evaluation assessment, some of the most important areas of improvement, according to volunteers, are the measurement of basic screening indicators and program outcomes, more thorough health education training, cultural sensitivity,

follow-up, and community communication and empowerment. PPS will attempt to implement some of the suggestions this year. In particular, PPS has been coordinating with the local medical community to double the referral network and to have a Juventino Rosas physician at the screenings at all times. Volunteers believe that an on-site physician, in a similar role to Dr. Carolina's in 2007, is the most critical avenue to enhancing follow-up because the local doctors speak the language, can prescribe appropriate medicines, and provide patients with a trusted face. As of this summer, medical students will also be gathering longitudinal data and patient identifiers, which should enhance follow-up and allow for outcome measurement.

This year, PPS will hold its first health education training classes, as well as a session on cultural sensitivity. The 2008 MS1s are re-wording *El Perfil de Bienestar* surveys and testing them to increase cultural appropriateness. Additional changes, such as more frequent decision-making meetings with both the Church Delegation and community members, should improve communication and empowerment. As PPS begins a cyclical process of constant evaluation, program planning and implementation will continue to adjust accordingly.

Program Evaluation

Evaluation Overview

This portion of the paper is an evaluation of the Proyecto Puentes de Salud screening process. An implementation evaluation is important for several reasons; it will help PPS leaders know how well the program is meeting its objectives and goals, the magnitude of implementation effectiveness or ineffectiveness and the avenues for improvement, and the degree to which PPS is aligned with the target population needs. The program planners can use the assessment to maximize project strengths and to identify and minimize barriers to implementation, addressing immediate issues such as the proper direction of resources and involvement of community stakeholders.

Ultimately, longer term evaluation will attempt to determine if PPS is increasing cardiovascular knowledge, changing lifestyle practices, and improving cardiovascular health in the communities surrounding Juventino Rosas. PPS will build the evaluation methods into the planning framework of the program, promoting a constant process of improvement. Thus, the evaluation at this juncture is formative, however planners will construct summative measures now to support a future summative assessment.

Evaluation Models and Evaluators

The Evaluation Model and Its Inherent Limitations:

The structure of PPS's evaluation aligns well with the decision/accountability-oriented prototype described in Daniel Stufflebeam's *Evaluation Models*.⁵⁹ This form of evaluation is comprehensive, employing democratic principles and involving all stakeholder perspectives, incorporating mixed qualitative and quantitative methods, aiming for continual improvement,

including formative and summative techniques, and achieving professional standards of evaluation. It seeks to appraise the program's merit and worth, determine if the program is meeting its objectives, and examine implementation in-depth.

One weakness of this evaluation approach is that involving all stakeholders can be time consuming and impede progress if many differing opinions exist. PPS is willing to accept this possibility, because the participatory nature of the evaluation is critical in the eyes of the stakeholders. Another weakness is that evaluators may have trouble maintaining an unbiased perspective, as I outline in the next section.⁵⁹

The Evaluators and Their Limitations:

To maximize stakeholder empowerment, PPS will use internal evaluators who are trusted by the communities and who can involve the patients in the decision-making process. Internal evaluators are appropriate for PPS because they can translate evaluation results into direct action more readily. The internal evaluators understand the project interworking in detail and, being medical and public health student volunteers, can greatly reduce the cost of the evaluation.

However, limitations to using internal evaluators exist. The evaluator may be so closely tied to the program that he or she may not be able to extricate him or herself to see the broader picture and present unbiased findings. In the case of PPS, this reality is particularly relevant, as the two main evaluators are part of the original leadership of the project. The use of an unbiased external evaluator at some point in the future might provide more credibility and attract larger funding sources.⁶⁰ The successes and failures of PPS seen through the lens of an external evaluator may eventually aid other programs in their planning and evaluations.

Evaluation Issues Identified by the Logic Model

Construction of the logic model helped elucidate several problems that relate to screening implementation: 1) the methods and frequency of communication between the community and the US project leaders were resulting in wasted resources; 2) volunteers were not tracking patient follow-up, total number of patients screened, or Charla attendance; 3) no continuing care system was in place to monitor at-risk patients; 4) student volunteers conducting the health talks had little formal training to ensure cultural sensitivity; and 5) volunteers were not tracking longer-term indicators in intervention and control communities that would help determine impact. Other problems I had previously considered were the cultural sensitivity of the survey instrument, *El Perfil de Bienestar* Health Risk Assessment, my ignorance to whether all students were asking questions in a standardized fashion, and my uncertainty about whether recruitment techniques and screenings times were attracting or deterring participants.

Although I had personally identified these problems, did other stakeholders share my concerns, and if so, how could PPS rectify these issues? To determine the evaluation tools that would help me answer these questions, I conducted a literature review that is available under Appendix A. This review helped determine that focus groups, supported by quantitative and other qualitative data, would be the driving force of the short-term project evaluation.

Evaluation Design and Methods

As mentioned above, the short- and long-term program questions will require both qualitative and quantitative methods. In the short-term, PPS will attempt to gain insight into volunteer and participant perspectives, as well as assess resource use, the implementation of activities, and the measurement of outputs as they relate to the cardiovascular screenings and

health talks. In the long-term, PPS will examine if the program is attaining the outcomes of improved follow-up, cardiovascular knowledge, and lifestyle practices, and the impact of better cardiovascular health in the communities. To ensure that PPS is meeting its goals, the program will base many of its short- and long-term evaluation questions on its stated objectives. These objectives-based queries are enumerated in the evaluation planning tables in Appendix C.

Short-Term Evaluation:

Thus far, PPS has reviewed the literature to see how other cardiovascular programs have implemented screenings, to examine standard practices, and to investigate some of the potential barriers that rural Mexican communities might face. Student leaders then conducted open-ended interviews with community members, the Director of the new Juventino Rosas Hospital, the JR Secretary of Health and Education, the Church Delegation, local doctors, US medical students, and US doctors and faculty to determine stakeholder opinions on barriers to care, community needs, and the effectiveness of the screenings and the Charlas.^{6, 9, 10} These preliminary discussions have helped craft the protocol for the foundation of the short-term evaluation: the focus groups that examine implementation in more depth.

Based on the information gleaned from the focus groups, PPS planners will develop standardized surveys that they can distribute annually to all stakeholders to track resources, activities, and outputs. Activity logs will document the numbers of participants and referrals, as well as the percent of patients following-up on referrals. Quantitative quasi-experimental pre- and post-tests without comparison groups will determine if community members understand the Charlas. These measures will support a continual system of evaluation and provide data for longer-term assessments as well.

Long-Term Evaluation:

Outcomes like improved follow-up can be measured by short-term indicators, such as the percent of patients that seek follow-up care and the percent that obtain care on a continual basis. However, PPS must gauge the effects of the screenings and health talks on cardiovascular knowledge, lifestyle practices, and the overall health in the communities over an extended period of time. Particularly, PPS needs to collect data in control communities and begin assessing cardiovascular knowledge.

Document review and open-ended interviews will help mold the surveys for quasi-experimental studies of cardiovascular knowledge, lifestyle practices, and overall health in the intervention and control communities. Regression point displacement in the form of pre- and post-tests with comparison groups will assess knowledge, lifestyle and health by self-report, taking into account potential confounders such as education level, age, socioeconomic status, and co-morbidities.^{18, 61} Document review, open-ended interviews, focus groups, and open/closed-ended surveys can help elucidate other potential confounders, and focus groups can examine stakeholder perceptions of the project and its effects on community health and knowledge.

Additionally, as the Health Belief model explains, health knowledge may not translate directly into behavior modification if the barriers to change appear insurmountable, therefore open-ended interviews and focus groups examining obstacles to lifestyle change are critical.⁵¹ Because self-reported data suffer from measurement bias, PPS will incorporate additional means of assessment, such as clinical appraisal of cardiovascular health and multiple choice comprehension tests that evaluate cardiovascular knowledge. Indirect measures of lifestyle behavior, such as counting the numbers of people exercising, monitoring changes in local market

purchases, or tracking BMI, will also corroborate self-reported findings.⁶² Document review will identify if other programs have had success with indirect lifestyle measures.

Obstacles to Short and Long-term Evaluation:

PPS has already noted some of the obstacles to performing a thorough evaluation. Money is a critical issue for the program, seeing as evaluations often require five to seven percent of a program budget.⁶⁰ Additionally, the quasi-experimental methods that the project planners will use to measure change are imperfect, and will be implemented by students who may not be proficient in evaluation techniques. Cultural sensitivity of the instruments has been an impediment for the past two years, and may be transmitted over to evaluation measures if evaluators do not develop the tools correctly.

Another difficulty will be finding comparison group data for the overall health of the communities; pre- and post-tests will reveal changes in the health of intervention groups, but volunteers cannot screen control communities. If PPS compares the intervention group results to national health data on rural Mexico, the internal validity of the study will be threatened because the national surveys and PPS will inexorably have differences in recruitment, screening methods, clinical measures, inclusion and exclusion criteria, geographic location of communities, and the screening dates.⁶³ Our focus group data can provide insight into patient perceptions of change that may corroborate the quantitative findings.

Focus Group Methods:

As the cornerstone of the short-term evaluation is the focus group, this paper will provide a more thorough outline of the focus group design and methods below.

Question Design and Moderator Roles:

Based on the queries generated by the logic model, PPS divided the focus group session into four distinct open-ended questions relating to general screening implementation, student education, logistics, and final thoughts. PPS planners designed the four broad topics to allow for free dialogue, with probes listed as subtopics to tease out the subtleties of each issue. Because I was interested in general screening implementation, data collection, communication, and the Charlas, I incorporated these themes in the probes. The moderator ran each session, keeping his wording as neutral as possible and asking the probes if they were not sifted out in the general discussion. The assistant moderator served as the gatekeeper and timekeeper for the group, took notes, examined the group's interaction, and monitored the audio taping equipment.⁶⁴

In formulating the questions, PPS leaders attempted to avoid double barreled and loaded questions, to limit the probes to the most salient concerns, to ensure that the participants understood that the time frame for the queries was the past two years, and to let the participants know how much time each section would take.⁶² Planners also avoided using vague question stems such as “frequently” or “regularly” and incorporated enough context in the questions to enhance participant understanding of what the moderator was asking.⁶⁵ Some questions asked for both thoughts and feelings of participants because the PPS training session stressed that focus groups should cater to the different ways in which people consider questions.⁶⁴ The focus group protocol is in appendix B.

Administration of the Focus Groups:

PPS obtained IRB approval in January 2008, as well as a \$3500 grant from the Department of Family Medicine to run the focus groups. In February 2008, PPS leaders

administered the questions to all student, doctor, and faculty volunteers who had participated in PPS over the past two years, as well as the Mexican community Delegation and patient participants. The four 90 minute focus groups conducted at UNC had five to seven people per group, and were divided into 2006 students, 2007 students, 2006 doctors, and 2007 doctors. The data likely reached saturation because all the volunteers participated with the exception of two undergraduate students and two doctors.^{66, 67}

In March 2008, two native speakers ran two additional focus groups with the Church Delegation and members from a community that PPS visited in 2006, Cerrito de Gasca. The first group was comprised of two community members and three Delegation members. The second group contained six community members and two Delegation members. Because the literature review in Appendix A revealed that focus groups conducted in other languages should be transcribed and analyzed, if possible, in the native language of the group members, we hired Spanish-language transcribers and are analyzing the data in Spanish.⁶⁷

For all groups, PPS protected participant privacy by avoiding the use of name identifiers in the transcriptions. The Spanish transcribers, Ian Nelligan, and I transcribed the audiotapes immediately and then destroyed them. The moderator obtained verbal consent from participants prior to the discussions, making sure that the harms and benefits of participating were clear.

Limitations:

Some limitations of administering the focus groups exist. Because designing surveys and focus group questions is difficult, the focus groups should be piloted prior to implementation. Unfortunately, due to time constraints and the specific nature of the queries, PPS has not been able to test the protocol. Therefore, Ian Nelligan and I reviewed the focus group tapes after each

session and modified the protocol accordingly. Another limitation is that because we wanted to get a true feel for the conversations and planned to quickly modify the protocol after each focus group, we reviewed the tapes and transcribed the data, therefore we have some idea about which participants said which comments. Ian Nelligan and I as data analyzers are highly invested in the PPS project and have close relationships with many of the volunteers, thus we introduce bias into the results. To eliminate some of this bias, we were not present during the focus group sessions and did not include name identifiers in the transcriptions. Beyond these measures, we must simply acknowledge and be aware of our own biases.

Lastly, PPS planners are unsure of the cultural sensitivity of the questions being asked. The Mexican Delegation and patient participants may not be able to answer specific questions regarding the intricacies of the screening process. Focus group designers adjusted the protocol, however due to time and money constraints, the planners were not able to test the translated version in Mexico prior to implementation. PPS will further modify the protocol and administer it in Mexico again during the summer 2008.

Analysis:

First, I stated my research objective: I wanted to know stakeholder opinions on the ways in which PPS screening implementation had been effective or ineffective, as well as record suggestions for implementation improvement. Then, I scanned the transcripts, highlighting all relevant text and searching for repeating ideas, particularly concepts that were reiterated across groups. I organized these ideas into themes and broader theoretical constructs, as evident in Table 5 below.⁶⁸ I conducted the analysis in a cyclical fashion; each subsequent focus group supplied new data for the groupings, or added new themes. After every focus group cycle, I

pulled each comment and examined it in context to make sure that the data interpretation was correct. Finally, I explored the most common themes and drew conclusions from the discussion. I did not use an analysis program, but rather created the categories in a Word document. Because triangulation and member-checking can enhance the validity of the data, PPS will consider if the results are in line with the literature and with what one might expect, as well as send the results to the participants to make sure that they concur with the conclusions.^{66, 69}

Table 5. Theoretical Constructs, Themes, and Recurring Ideas⁶⁸

- I. PPS is likely effective, but effects are yet unmeasured
 - A. Likely positive effects
 - 1. building ties & infrastructure
 - 2. improving individual health & access
 - 3. raising knowledge and awareness
 - B. Measurement using appropriate indicators
 - 1. No way to know the magnitude of effect
 - 2. Suggestions to measure effects (name identifiers, BMI)
- II. Health education talks are useful but must be more patient-centered and should be measured
 - A. Charlas are a good way to disseminate information
 - 1. Attendance was high and people were receptive
 - 2. Knowledge is the first step to action
 - B. Charlas need to be culturally sensitive
 - 1. Students need training
 - 2. Concepts should be simplified
 - 3. Pictorial and participatory improvements
 - C. Measuring knowledge retention
 - 1. Pre-and post tests
- III. Follow-up was not measured and can be improved
 - A. Poorly executed follow-up
 - 1. Access issues
 - 2. PPS not measuring follow-up
 - B. Improvement suggestions
 - 1. Longitudinal data
 - 2. Local physician on site
 - 3. Spanish-proficient US doctors
 - 4. Mailing reminders & paper system
 - 5. Same-day transportation
 - 6. Location specific drug, doctor, & insurance information
 - 7. Training lay health workers
- IV. Communication, Empowerment, and Cultural Sensitivity
 - A. Communication is poor

1. Lacking communication among all stakeholders
2. Improvement suggestions (monthly emails, Google groups, information packets)
- B. Community empowerment is low
 1. Planning and decisions made by students
- C. PPS is culturally insensitive overall
 1. Charlas
 2. Questionnaires

Focus Group Results

Although PPS planners have yet to complete the analysis of the Mexican focus group data, some poignant themes have already emerged from the four UNC groups. Overall, stakeholder opinion of PPS was positive, with all groups concurring that the program has had a beneficial effect on the community and on the students. However, the US volunteers had concerns about the lack of implementation and outcome measurement, the potential for more effective health education, the inattentiveness to cultural sensitivity, the insufficient follow-up, the poor communication between PPS stakeholders, and the inadequacy of community empowerment to date.

Theme One: Measurement Using Appropriate Indicators:

Every group remarked that PPS is not measuring indicators that might assess the effectiveness or ineffectiveness of the screenings. The general consensus was that the project probably has positive effects in the communities in terms of improving individual health, raising knowledge and awareness of chronic diseases, building ties, and influencing local health infrastructure, but the current implementation process does not involve indicators that might more definitively express those effects. Stakeholders suggested using longitudinal data, employing indirect measures, and tracking annual BMIs as techniques to determine the effects of the project.

Focus group participants made comments such as *“I think that a goal we should have for the future is to be able to start quantifying, in some way, the effect of the project in the communities”* and *“so there’s a lot of anecdotal stuff that support it, but we don’t have any measure.”* Volunteers wanted to believe that they had an impact, but were at a loss as to the extent of their influence, saying, *“I think that it had some positive effects. As far as the magnitude of that, pretty hard to say.”* and *“We don’t have any way to measure, really.”*

The doctors provided more insight than the students into how PPS might begin to measure its effects; several commented that yearly changes in BMI in the communities would provide more insight than yearly variation in more unpredictable measures like blood pressure or glucose. *“I don’t think it would be as effective measure something simple like one single blood pressure over time, because this can be affected dramatically by so many things.... We weren’t checking AICs so a single blood sugar can equally be as affected, but I think checking BMIs have a way of correlating the other health indicators.”* Responding to the question of how PPS can measure the effect in the communities, both students and doctors strongly expressed a desire for longitudinal clinical data through patient identifiers, mentioning, *“...and also we’ll have longitudinal type data if we can start taking name identifiers, which we are hoping to incorporate in the IRB this year”* and *“I think that it would be good if they can continue to measure the same variable that they are measuring year to year, because then they can compile a richer data base and look at changes over time.”* Two groups out of four acknowledged that self reported variables such as health status or medication use may not be valid, indicating the need for other measures. *“The problem with that [measuring medication use] is people often really want you to come back, and will say things to please you so the reliability of that is really hard to judge.”*

Theme Two: Health Education Talks:

Although all groups extolled the health education talks as successful, they again expressed a need to measure that success, to determine whether it is real or miscalculated. Stakeholders felt that pre- and post-tests of Charla attendees would provide valuable information about Charla effectiveness. Other concerns regarding the health education talks included the lack of cultural sensitivity, a common theme throughout the focus groups, and the need for student health education training.

Pre- and Post-Tests:

Two groups mentioned the benefit of pre- and post- surveys in gauging the magnitude of information retained. PPS administered one such survey last year and the student focus groups lauded the initiative, expressing that a more culturally sensitive version of the survey would be desirable in 2008. *“I would say it was a great idea to do what [student’s name] tried to do last year: a survey after the talk to see how much was retained.” “It was a great idea, but his questions were way in depth, I didn’t even know the answers to some of them.... And so, all you need to do is say, look, people have zero knowledge and go from there.” “I think if that [the questionnaires before and after health talks] were done more effectively with appropriate questions, appropriate wording, I think that would be a really good way for us to start getting a sense of how effective the talks are.”*

Charlas Need to be Culturally Sensitive:

The groups unanimously mentioned cultural sensitivity as an area of weakness in the health education talks. *“On the down side they had some of the same problems of cultural*

sensitivity, not that they were insensitive, but that they didn't fully appreciate the literacy level in the communities. It's hard for someone that is highly educated and not a native Spanish speaker to cross the literacy and cultural barriers and frame the educational material in a useful way."

Stakeholders discussed some suggestions to improve the sensitivity, advising the use of more pictorial aids, game playing, and the involvement of participants in group activities. They articulated, *"...because some people may not be able to understand my Spanish, but if there's a visual that they can see, not just a list of words, but actually pictures, to cater to the low reading level."* and *"We could have them discuss what kind of a meal could you make and then have examples of foods, like what we did two years ago, or break people into little groups. I think that breaking into little groups is good because when we had people in smaller groups, they were more likely to engage and talk and I think that's when people will internalize the information."*

Students Need Charla Training:

When the moderator asked the students if Charla training would be helpful, they replied in unison with an emphatic, "Yes!" The 2006 students felt that training was, *"...important as far as being able to effectively communicate the health prevention messages that we're hoping to impart and leave down there."* A 2007 student elaborated, explaining that in the past, a gradual increase in experience throughout the summer had been the only method by which students improved the effectiveness of the Charlas. Hopefully, health education training this year should prepare the students better for conducting the Charlas. *"I think we really need to think about how to go about doing that [Charla training], because I think we weren't doing all that well at the beginning but we did get better as we were going through. I hope they'll [the 2008 students] be able to give them [the Charlas] right off the bat this next year, and do a good job with them."*

Theme Three: Cultural Sensitivity:

The groups noted that cultural sensitivity was lacking across categories, from health education, to counseling, to the patient questionnaires. In particular, group members considered the *El Perfil de Bienestar* Health Risk Assessments to be completely inadequate; patients did not understand the questions and volunteers became so frustrated with the format that they reworded the queries or stopped asking them entirely, compromising the validity of the data.

Participants expressed their dissatisfaction with the current level of attention paid to cultural competence, making statements such as *“I feel like everything could be more culturally sensitive”* and *“We also have to be more sensitive culturally to what is happening, and match the needs of the people there culturally. By that I mean I felt that the questionnaires were not very culturally sensitive. We never ran, pre-tested, these things, after we translated them into Spanish, before we got down there, and we never ran them, pretested, piloted, after we got down there with people that could have given us some aide, in terms of understanding how we need to frame the questions so the people in the communities understand them.”* Almost all survey instruments suffered from this problem. *“Even last year we went with the PHQ9 and translated that into Spanish; over time I had the sense that people were not getting the meaning of the questions ... it was so out of keeping with anything that they might think... how they live their life or how they think about their life, that it just didn’t have any meaning for them.”* These issues were explored in more depth during the Mexican focus groups, and those transcripts will provide the communities’ perspectives on the survey instruments.

One group mentioned that the questionnaires were so insensitive the first year that some volunteers were changing the wording of certain questions, reducing the internal validity of the research. Although the surveys were translated “evidence based” instruments, their use in rural

Mexico revealed that they were not appropriate for this population. *“...what happened as a result was getting bad data. For example, this wasn’t a good question so we won’t ask this one, but we’ll ask this one, and different individuals picked differently so there ended up not being a standardized data collection instrument...there were many sort of variations and improvised versions that people actually used.”*

Theme Four: Follow-up:

Another significant theme included PPS’s lack of follow-up measurement and fragmented continuity of care process. To improve follow-up, groups provided a myriad of recommendations, suggesting addressing access to care barriers; using name identifiers; standardizing the paper referral system; mailing reminders; providing same-day free transportation to the clinic; training lay health workers; giving drug, cost, and insurance information to patients; choosing competent, Spanish-proficient US doctors to precept; and having a local doctor at the screening site each day. The four groups felt that the most important way to increase continuity of care would be to bring a Juventino Rosas physician to the site because local doctors can counsel quickly, relate to the patient culturally, understand subtle nuances of the language, and provide a visible, trustworthy face for the patient to make an appointments with.

Follow-up in General:

All the focus groups had lengthy, in-depth discussions about these issues, and all began the discourse by commenting on the overall inadequacy of the current follow-up system. One group said, *“Well, it [the program] is only as effective as the follow-up. So I think that that is one*

of the big limitations to the project as it stands now. Even though we were telling people that there is the doctor in JR, that here is his phone number, and saying he will see you at a discounted price, I still think that very few people actually did that.” Another group concurred, stating, *“I strongly feel that not tracking follow-up and not making follow-up a major priority are major weaknesses for us right now.”* Focus group participants agreed that PPS should begin tracking the number of people that receive follow-up care, and opined that better knowledge of continuity of care would translate into a more encompassing understanding of the overall effectiveness of PPS. *“As far as measuring the effectiveness of the program, another way would be to have some sort of way of measuring how many patients who get recommended to go into follow-up care actually go to that follow-up care.”* One of the doctor groups echoed this sentiment: *“One of the things I would like to know is if it indeed had a positive impact in the long run, did they seek attention, did they have a change in their management, follow-up.”*

Keeping a Local Doctor on Site:

Having a local physician on hand during the screenings was the most popular solution to the follow-up problem. *“So most especially in the places where we were able to provide immediate quality follow-up with a [local] physician, I think that’s where we made the largest impact.”* In particular, the local doctors are important for facilitating trust. *“It’s just such a big difference if you can tell them [the patient] that they can see a person again, who is already there, so they’ve already established a relationship with the doctor. Instead of doing a referral with a doctor that they’re never going to see again.”* Another group said, *“I think to some extent it’s a function of who is doing the convincing. The local doctors were staying with the patients, talking to them, listening to them, building some measure of trust.”*

Focus group participants felt that including local doctors was feasible because PPS's relationship with the Juventino physicians has grown substantially over the past two years.

"...we started to form this better relationship with the medical college there and they have said that they want to have a Mexican doctor in the communities with us every day next year."

Additionally, two local general practitioners attended several of the PPS screenings last year, and the volunteers greatly appreciated their expertise. *"Last year a doctor came out to the community where we were having the health fair at, a Mexican doctor, and I think that that was a really good... she was really helpful to be able to speak in a way that was more culturally appropriate. It's different with a doctor who is from the community and speaks the language completely fluently and is also able to follow-up and to hold the person accountable."*

Recruiting Spanish-Proficient US Doctors:

However, including local physicians in the PPS screenings was not the only potential solution. Focus groups cited the cultural competency and Spanish-language proficiency of the US doctors as a critical component to proper follow-up as well, making comments such as *"I guess I feel pretty strongly that it was really affected by even the American physicians who were talking to the people"*, *"I feel pretty strongly that as long as there are enough physicians who are interested in going down with us, we should try to keep it to people who speak Spanish. The weeks we had a really good system with the doctor who we took the patients to, who then spent a half an hour, or a chunk of time with the patient, I think those were probably the most effective weeks"*, and *"I really did feel like some of the times the doctors down there that either had little or no Spanish speaking ability who ended up doing vitals, blood pressures, ended up being more of a hindrance to our system than a benefit."*

Transportation and Handouts:

Another suggestion involved offering same day transportation to high-risk patients. *“...but if we find out if that’s feasible and we actually provided the transportation for the emergent care that we saw that day we could be more confident that they were getting some kind of care.”* Also, focus groups believed that providing culture-specific drug and disease-management information would be helpful. Although PPS has hand-outs outlining hypertension and diabetes, these pamphlets do not explain local drug information or ways to access the healthcare system. *“I don’t know whether it would be as simple as these are the 5 main drugs that are available for this category of disease and this where they are available and what they cost, just information about to leave with the participant so they could better understand what they are looking at with a new diagnosis.”*

Training Lay Health Workers:

Lastly, stakeholders felt that training lay health workers would also be a way to disseminate information to large groups of people during the months that PPS is not present. *“I think the idea of training people to go into communities and form groups where they could give lessons on nutrition. If you sent a nutritionist in, you could get both the hypertensives and diabetics, 20 people at a time, and you could reach a lot more people at a time that way.”*

Theme Five: Communication and Empowerment:

Finally, focus group participants spoke about communication among the many stakeholders, observing that the frequency of communication could be increased, and that PPS could improve community empowerment and involvement in the project. Often, the US

volunteers may assume that that they have the communities' interests in mind without consulting their Mexican counterparts thoroughly. This process could lead to resentment and result in PPS not serving the communities' most pressing concerns.

Communication in General:

The students in particular believed that the communication among PPS stakeholders is less than ideal, making remarks such as, *"I think communication is a big issue between all the students who are working on it, and the students and the physicians, and the students at both schools"* and *"I felt like last year, communicating among the group was lacking."*

Communication Suggestions:

Some of the student suggestions on improving this communication barrier were new ideas. *"Maybe whoever is in charge of the student group sends out an email once a month saying, this is what we've been doing in the past month, this is what we hope to do. Because a lot of people feel like they have a stake in this project's future, and it would be nice to have a little update once in a while."* *"...it would be a good idea to have a packet of the information about the group, that the first year students would get when they come in, that would orientate them a little bit."* Some proposals have already been implemented by the PPS leaders. *"We've actually made a Google groups page for that now."*

Empowerment:

Unfortunately, none of these recommendations will serve to improve communication lines between the US contingent and the rural community members. However, two of the focus

group did stress that the project must be more mindful of the communities' needs. *"If you're doing an international intervention, the community should have the power to say whether or not they want you to come back next year, and that makes me question in my mind, does the delegation or the people of JR...have the level of authority and autonomy to say, 'don't come back next year, if you're going to come back, do it differently.' And I don't really think they do; so much is driven by what the students want to do, which of the screenings get done is what we want to do."* Responding to a comment that PPS should keep cardiovascular screenings as its mainstay, a doctor cautioned that the ultimate goal of PPS should be to meet the needs of the community. *"Well that's [cardiovascular screening] good for them in the data collection but that might not be the best thing for the community.... I want to meet the medical needs of the community and not just of the research project."* Perhaps suggested by the lack of conversation directed towards improving communication with the Mexican communities, PPS still has much work to do to further empowerment.

Focus Group Conclusions:

Thus, some broad themes emerged that were considered critical to PPS stakeholders in the US: process and outcome measurement, cultural sensitivity, follow-up, communication, and empowerment. Although the overall tone of the groups was positive and PPS volunteers were excited for the future of the project, the groups believed that improvement is both necessary and feasible. The current political and health care contexts are ripe for enhancing communication with the Mexican stakeholders, patient follow-up, and community empowerment.

Viable suggestions such as training students in health education and including more local doctors in on-site counseling will be operable this year. Other proposals, such as judging the

effects of the screenings on the health of the communities, are harder to measure and must be applied by planners over the next five to ten years. Continual evaluation and analysis of the Mexico focus groups will further tease out some of these themes.

Conclusion

Dissemination Plan

Already, planners have gained much insight into areas of program improvement from the focus group sessions. The project evaluation will provide PPS with the knowledge to alter the program plan on a yearly basis, yet this information must be disseminated appropriately to all stakeholders if planners are to incorporate the findings into the program plan. Evaluators will distribute results and conclusions from surveys, focus groups, activity logs, and open-ended interviews to stakeholders in writing and through informal discussions. PPS will hold meetings in the US and in Mexico to discuss changes to implementation. Integral to this dissemination process are the informing of community members and the use of their input on decisions; full involvement of the community will enhance empowerment. Longer-term data will be available five and ten years from now, and PPS will distribute this information in a similar manner.

Summarization of the PPS Plan and Evaluation

The communities of rural Mexico face access to care issues and complex socioeconomic contexts that obstruct their right to health. In particular, cardiovascular health is a major concern because cardiovascular disease and its associated risk factors have been steadily climbing in Mexico for the past 30 years and are the top causes of mortality across the nation.² Considering this burden of suffering, the vast potential for effective prevention, and the expressed desires of

the rural communities surrounding Juventino Rosas, a cardiovascular screening program is warranted in this area.

However, simply because a need exists for a service does not mean that a program intervention will be effective at meeting that need. Careful planning, integrated with continual evaluation, is necessary to make yearly program improvements in areas that are not operating efficiently, as well as track resources, activities, and outputs. Thus far, PPS has detected a host of such problems in communication, follow-up, cultural sensitivity, community empowerment, medical student training, and basic measurement of outputs. Subsequent short and long-term evaluations will use quantitative and qualitative methods to further exam these issues and provide a framework for future planning.

Barriers and Limitations

Barriers to implementation must also be acknowledged, especially in a population so diverse from our own. Planners must constantly be sensitive to the obstacles that exist and adapt to surmount impediments as they arise. Community members are the best resource for identifying these problems; from simple open-ended interviews, PPS was able to fully appreciate the depth of the socioeconomic barrier to healthcare and the ways in which this hurdle affects indirect influences on health such as food and water supplies and health knowledge.

The limitations of planning and evaluating such a program are numerous. First, time constraints and the meager resources available to the medical students hinder their ability to conduct a thorough evaluation and to incorporate all potential improvements into the program plan. Second, differences in culture and the many contextual obstacles faced by the communities prevent the project from being maximally effective in attaining its objectives. Third,

improvements in outcomes such as health knowledge are simply intermediate steps in achieving the ultimate impact of improved cardiovascular health; the transition between awareness and action is a difficult one to promote. Finally, the evaluation in particular will suffer from intrinsic biases, as the evaluators will be internal investigators who have strong investments in the program and who are relatively culturally ignorant of the population that the evaluation is meant to benefit. With time, PPS may have the funding to support an external evaluation to address this limitation.

Recommendations

Based on information gleaned from the focus groups and the logic model, as well as the contexts that PPS operates within, I have made the following recommendations for the improvement of PPS:

- 1) *Recommendation:* Enhance communication among the US volunteers and between the US and Mexican contingents by increasing the frequency of communication and including all stakeholders in the decision-making process. Emailing monthly updates and posting to a universal Google website are two ways to expand communication avenues, however volunteers should explore other techniques that extend contact with the communities. In particular, instating a community task force would help facilitate community involvement.
- 2) *Recommendation:* Begin to measure program effects by incorporating longitudinal data with patient identifiers; tracking numbers of participants attending screenings, health talks, and follow-up visits; conducting pre- and post-tests during the Charlas, and investigating indirect measures.

- 3) *Recommendation:* Improve the cultural sensitivity and effectiveness of the Charlas by holding student health education training sessions. Volunteers can also develop cultural sensitivity by re-wording and standardizing the survey instruments.
- 4) *Recommendation:* Strengthen PPS ties with the medical college in Juventino Rosas, double the local provider network, and schedule a local physician to attend the screenings at all times. Consider providing same-day transportation for high risk individuals, handing out location-specific medication and provider information, selecting US preceptors based on Spanish skills and specialty, and training lay health workers to provide year-round education in the communities.
- 5) *Recommendation:* Use the focus groups and the logic model to draft a standardized screening protocol before the 2009 screenings.

This paper will serve as a guide to PPS leaders for cardiovascular screening implementation planning and evaluation. Organizers can use these recommendations to structure the program and to determine if PPS is attaining its objectives. Hopefully, planners will also become more aware of the cultural, social, and political environments facing the communities, and will strive to include these often marginalized stakeholders in the decision-making process. The expectation is that standardizing PPS methods and implementation will translate into a more effective intervention.

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Appendix A

Literature Review: Rationale for Focus Groups

Question One:

I posed the following question: What evaluation methods and tools have researchers used to evaluate cardiovascular screening programs in the general adult population?

Search Strategy:

I searched PubMed for articles in English using the phrase “community health services AND program evaluation AND coronary heart disease”. I incorporated manuscripts published in peer-reviewed journals that conducted evaluations, including cost, impact, and qualitative analyses. The 71 results yielded three relevant articles. I found two more articles by Googling “program evaluation” AND cardiovascular screening. Through reference review, I found one additional article. I eliminated two impact studies because they had no comparison group.

Cost Analysis:

I discovered that cardiovascular screening programs, and screening programs in general, tend to look at cost-effectiveness and impact. One study that looked at cost data, Rasmussen, et al., determined mean direct and total costs, as well as life years, gained by randomizing a population of 1,507 Danish adults between the ages of 30 and 49 to three groups of (A) general preventive health screenings alone, (B) health screenings and lifestyle counseling, or (C) no screenings. The five year average gain in life years was 0.14 for group B compared to C ($p < 0.001$), and 0.08 for group A compared to C ($p < 0.01$). For the gain in life years, no additional direct or total costs were accrued.⁷⁰

Although RCTs should have little selection bias, Rasmussen, et al. did not include a baseline comparison table and did not explain the randomization technique. Patients were not masked and the paper does not mention if doctors were masked. Drop outs were high, yet equal, being 28% among the intervention groups and 26% among the controls. The researchers did not detail cross-over numbers, but did use intention to treat analysis.

Measurement bias was also likely because the authors calculated costs from different years and some cost data were not available. They did not examine long-term outcomes such as morbidity and mortality, which might have supplemented their analysis. Because the study targeted adults in Denmark, the methods and results may not be generalizable to a Mexican population.

In spite of the study short-comings, Rasmussen et al. demonstrated a successful use of cost data in evaluation. Cost-analysis is a common tool used to determine if health screenings are effective. Generally, if the cost of screening exceeds \$50,000 per life year gained (€34,000/life year), the intervention is not cost-effective.⁷¹

Impact and Quantitative Analysis:

The Coalfields Healthy Heartbeat (CHHB) is a project that brought cardiovascular screenings and community-based risk reduction through task forces, media, exercise programs, and classes, to a high-risk town in Hunter, Australia. Higginbotham, et al. evaluated CHHB with an impact study and quantitative analysis of the implementation, looking at clinical outcomes such as myocardial infarctions (non-fatal, probable non-fatal, and fatal), as well as more indirect process measures such as the range of program activities, the interest and participation of the community, development and sustainability, and the barriers to participation. The study used a

robust quasi-experimental design involving pre-tests, posttests, and comparisons with other towns in the Hunter area. In adults aged 35 to 64, CHHB found little difference in non-fatal MI among groups, however it discovered that between 1983 and 1994, Coalfields had a significantly greater decrease in fatal MI compared to other regions (-10.9 in the age standardized rate/100,000 people, 95%CI -18.2, -3.6 compared to -7.0, 95%CI -9.3, -4.7).⁷²

The impact methods allowed for selection bias; baseline characteristics were not comprehensive and researchers did not adjust for confounders. The rates of hypertension and elevated BMI were greater at baseline among the Coalfields residents, potentially biasing results towards the null. CHHB studied clinical outcomes and process measures, but did not examine costs or adverse effects of the program, and did not quantitatively or qualitatively determine why population subgroups were not participating in activities. Additionally, the methods and results from Australia may not be generalizable to Mexico. Despite these shortcomings, the program was able to monitor successes and failures and adjust its activities based on those findings.

Qualitative Focus Groups:

The Georgia Cardiovascular Disease Prevention Initiative took a different approach to cardiovascular program evaluation. This group conducted nine focus groups from nine Georgian health districts to determine the supports and barriers to healthy lifestyle behaviors. The majority of the 92 participants were African Americans, persons older than 65 or between the ages of 12-18, and rural residents. Some barriers that participants cited included the built environment, time and work issues, fast food availability, health problems, few exercise facilities, lack of emphasis on minority programs, literacy issues, and lack of point of purchase assistance.⁷³

Researchers listed demographic data, but did not detail recruitment strategy, thus one cannot know if the sample was comprehensive and representative of the target population. The data were self-reported and may not have achieved a saturation point. Although the investigators offered analysis, they did not quote discussions. The methods and results from a sub-set of the Georgian population may not be generalizable to rural Mexicans. However, the richness of the data would have been difficult to attain quantitatively.

The National Heart, Lung, and Blood Institutes also conducted seven focus groups on cardiovascular knowledge and attitudes with 64 Washington D.C. Latinos aged 18-54, 66% female, and from 9 countries. Researchers collected additional demographic information and baseline cardiovascular knowledge in a survey. They discovered that participants understood in general what terms such as “cholesterol” meant, but had many misconceptions and did not have access to health information. Focus groups expressed a desire to have bilingual information available and cited obstacles to healthy lifestyles such as time, work, language barriers, fast food availability, and fatty traditional foods.⁷⁴

Investigators described the recruitment strategy well. Although the study was not a quantitative RCT, it used a mixed focus group and survey design, included quoted data in both English and Spanish, and had fair generalizability to a Mexican population because many subjects were recent immigrants from Central America.

Quantitative studies that examine impact analysis and program implementation would be useful to PPS to determine if the project is having an effect and reaching the community. Cost analysis may be too involved and unnecessary for this program, considering that the cost-effectiveness of cardiovascular screening has already been well-documented.²³ However, mixed studies that include qualitative analysis from focus groups may be appropriate for PPS because

QUANT can give a broad view of program function and impact and QUAL can tease out the details and real-world significance of the project.¹⁸ Focus groups are useful because they identify problems, barriers, and solutions from the community's perspective and pick up subtleties that quantitative analyses might miss. They are consistent with the Health Belief Model and Community Organization program theories that describe PPS, because they empower community members and help discover real world obstacles and beliefs concerning the topic.⁵¹

Question Two:

Once I had decided that focus groups appeared to be a solid evaluation option, I wanted to know: Are focus groups an effective tool in the evaluation of community-based programs?

Search Strategy:

I searched the ISI Citation Index using the prompt "Title=(focus groups AND (effectiv* OR evaluat*))". Of the 36 results, I found three relevant articles and one additional article through reference review.^{67, 75-77} I will highlight the most relevant article.

Article Review:

From 1994 to 1998, the Starr County Diabetes Education Border Health Initiative provided a one year educational and group support program for Type 2 diabetic Mexican-Americans in Starr and Hidalgo, TX. To determine what aspects of the program were useful and what could be improved, the researchers conducted six focus groups with 40 patients from the program. Participants cited barriers to health such as lack of diabetes knowledge, financial issues, lack of family support and motivation, and access to care.⁷⁵

Researchers outlined detailed recruitment strategies, inclusion criteria, and demographic information. Data were all self-reported and the authors did not support conclusions with quoted excerpts. The study had good generalizability; similar to many PPS patients, the Starr county participants were Mexicans with type 2 diabetes.

In the conclusion, the investigators highlighted the value of focus groups; they explained that the results were used to adjust the Starr County diabetes program and to determine the feasibility of starting programs in other counties. The most helpful tools of the program, diet information and recipes, instructional videos, and the supplies, were enhanced in future project implementation. Researchers also commented on the importance of a mixed design, which they had not used in this evaluation.⁷⁵

Other Articles:

Briefly, the other articles also support the use of focus groups. Nabors, et al. and Ansay et al. concluded that focus groups were important in providing an in-depth evaluation and allowing community participants to take ownership and contribute to a program.^{76, 77} Twinn used groups to conduct a process evaluation, identifying strengths and weaknesses of a cervical cancer screening and education program in Chinese women. She stressed transcribing and analyzing data in the participants' language, focus group sizes of around five persons, the potential effect of recruitment incentives on the quality of the data, and the need for participant briefing.⁶⁷

Evaluations of cardiovascular programs have primarily used cost-analysis, impact studies, and qualitative focus groups. For an evaluation of PPS, mixed QUANT and QUAL analysis is suitable because the project needs both big-picture understanding and detailed information to improve screening implementation. As the evidence has shown, focus groups are an effective

method of qualitative analysis that researchers have used in cardiovascular program evaluations, as well as other evaluations, to enrich the project.

As in the Starr County evaluation, PPS can use focus groups to narrow the scope of program implementation. This method is in line with program theory and can accomplish a short-term objective of PPS by involving all stakeholders in the decision-making process, facilitating community empowerment. Thus, in conducting the focus groups, we adhered to Twinn's advice, transcribing and analyzing Mexico data in Spanish, recruiting groups of about five persons, offering minimal incentives in the form of refreshments, and sufficiently briefing participants. Focus groups will be the foundation of the short-term implementation evaluation, however not all the salient questions can be answered by this method. The groups will identify areas of implementation that require further evaluation, and PPS will need to employ many other tools to investigate those areas.

Appendix B

Protocol of the Proyecto Puentes de Salud Focus Groups

Welcome, my name is <_____> and I was asked to facilitate this group because I was not involved in the Puentes de Salud Project during the past two years. Hopefully, you will see me as a neutral person. Assisting me this evening is <name of co-facilitator>. S/he will be taking notes and assisting if folks arrive late or need to leave early, so as not to disrupt the discussion. The discussion should last about 90 minutes.

We are not interested in the names of anyone but would like to record this session in order to ensure that we accurately document the discussion. If anyone has an objection to the recording, the recorder will be turned off. Does anyone have an objection? If no, we will proceed. You may answer any question you wish but you are not required to answer at all. We really appreciate your candid thoughts and discussion and hope that you will respect each other by waiting until the person speaking finishes before you begin. Also, we appreciate that you refrain from side conversations, so everyone can fully participate.

The primary objective of this discussion is to explore your attitudes and opinions towards the effectiveness of the design and implementation of the Puentes de Salud project. We emphasize that all comments made during this session should be kept confidential. While it is possible that participants may repeat comments outside of the group at some time in the future, we ask that you not do so. This is the only risk that we see in participating in the group discussion.

We will talk about four aspects of the project: 1) the project's effect on the health of communities surrounding Juventino Rosas; 2) the project's effect on medical education; 3) program logistics; and 4) additional thoughts on the program. Please offer your comments on each question and ideas on improvement when pertinent.

First, let's look at:

I. The Project's effect on the health of the communities surrounding Juventino Rosas (25-30min)

1. Think back over your experience with Puentes de Salud. Do you think that Puentes de Salud affected, in any way, (good or bad) the health of the Communities surrounding Juventino Rosas?

- 1) In your experience, how were the screenings provided during the health fairs in the communities surrounding JR effective or not effective?
- 2) In what ways were the health education talks effective or not effective?
- 3) What are your thoughts or feelings on Puentes de Salud's efforts to ensure follow-up care? How can follow-up be improved?
- 4) Were the screenings administered at the appropriate time of day to meet the needs of the community? If not, what times would you suggest?
- 5) Recruitment strategies included introductions at mass, fliers distributed in communities, and loudspeaker announcements. Do you think participant recruitment strategies were effective or ineffective at reaching everyone in the community?
- 6) What other feasible screenings or projects are needed in the communities in the future?

II. The Project's Effect on Medical Education (25-30 min)

1. Looking back over your experience with Puentes de Salud, how do you think PPS affected your medical education?

- 1) Did your experience with PPS teach you leadership skills and if so, what type of leadership skills?
- 2) Did your experience with PPS teach you about teamwork and if so, could you please give an example?
- 3) Did your housing situation contribute to your cultural experience? If yes or no, please explain.
- 4) Did the screenings that you conducted in the communities contribute to your clinical education? If yes or no, please explain further.
- 5) Did you feel adequately prepared to conduct the screenings in Juventino Rosas?

Now, on to the next to the last question:

III. Program Logistics (25 min)

- 1) Was PPS's interaction with the communities culturally sensitive or insensitive? In terms of the survey instruments? In terms of the Charlas?
- 2) Do you have suggestions on how PPS can improve communication among group members?
- 3) Based on your experience in Juventino Rosas and your interactions with the Juventino Rosas delegation, how can they be better integrated in the decision making process for the project?
- 4) In the past two years, the Mexican healthcare workers have not played a major role in the Puentes de Salud project. Based on your experience, how can the Mexican health care workers be better integrated into the project?

Now, for final thoughts...

IV. Final Thoughts (5-10 min)

- 1) Is there anything that hasn't been discussed that you think we need to know about?

Thank you for your time and your feedback! We will notify you about the results of these focus groups within a month.

Appendix C

Program Objectives and Evaluation Planning Tables

Proyecto Puentes de Salud Goal:

The Goal of Proyecto Puentes de Salud is to improve cardiovascular health in the rural communities of Juventino Rosas, Mexico by maximizing community recruitment and participation, by increasing the effectiveness of screening implementation and community health education, and by improving follow-up and access to medications and doctors.

Short-term Objectives:

- 6) Within one year, PPS planners will involve all stakeholders in goal setting and planning cycles by drafting, testing, and administering reliable implementation surveys for volunteers and patients.
- 7) Within two years, PPS planners will make screening implementation and health education talks standardized, measurable, and structured to amplify the effectiveness of the interventions.
- 8) Within one year, PPS first year medical students will add patient identifiers to the IRB to track patient follow-up.
- 9) Within one year, PPS planners will improve the referral system with local doctors to track continued patient care and medications.
- 10) Within one year, 100% of medical students will have undergone health education training, gaining knowledge and skills.

Long-term Objectives:

- 4) Within 5 years, 90% of referred patients will be seen by local doctors for follow-up.
- 5) Within 5 years, volunteers will observe measurable changes in cardiovascular knowledge and lifestyle practices among the rural community members.
- 6) Within 10 years, volunteers will observe measurable improved cardiovascular health in the communities.

Evaluation Planning Tables

*Evaluation Methods for each Evaluation Question are in chronological order

Administrative: Short-term Objective 1: Within one year, PPS planners will involve all stakeholders in goal setting and planning cycles by drafting, testing, and administering reliable implementation surveys for volunteers and patients.

Evaluation Question	Participant(s)	Evaluation Method	Information Use
According to volunteers and participants, how were the screenings provided in the communities effective or not effective? Has participating in PPS changed, or not changed, these opinions?	Medical Students Doctors & Faculty Church Delegation Community Members	Open-ended interviews Focus groups Open/closed-ended surveys	Will narrow the scope of the surveys by determining the most salient implementation issues.

Was the amount of time spent in each community appropriate or inappropriate to meet the needs of the community?	Medical Students Doctors & Faculty Church Delegation Community Members	Focus groups Open/closed-ended surveys	Will narrow the scope of the surveys by determining the most salient implementation issues.
Were participant recruitment strategies effective or ineffective at reaching everyone in the communities?	Medical Students Doctors & Faculty Church Delegation Community Members	Open-ended interviews Focus groups Open/closed-ended surveys	Will narrow the scope of the surveys by determining the most salient implementation issues.
What other feasible screenings or projects are needed in the communities?	Medical Students Doctors & Faculty Church Delegation Community Members	Open-ended interviews Focus groups Open/closed-ended surveys	Will narrow the scope of the surveys by determining the most salient implementation issues.
How can PPS better integrate community members into the planning process? How can communication with the Delegation be improved? Have volunteer opinions on communication changed over the past two years?	Medical Students Doctors & Faculty Church Delegation Community Members	Open-ended interviews Focus groups Open/closed-ended surveys	Will facilitate community empowerment, trust, and involve a potentially marginalized stakeholder group.
Are the implementation survey questions culturally appropriate or not?	Church Delegation Community Members	Open-ended interviews Focus groups Open/closed-ended surveys	Will ensure that the survey elicits useful information, as well as reduce confusion.
Do all key stakeholders understand the implementation survey questions?	Medical Students Doctors & Faculty Church Delegation Community Members	Open/closed-ended surveys Open-ended interviews	Will ensure that the survey elicits useful information, as well as reduce confusion.

Administrative: Short-term Objective 2: Within two years, PPS planners will make screening implementation and health education talks standardized, measurable, and structured to amplify the effectiveness of the interventions.

Evaluation Question	Participant(s)	Evaluation Method	Information Use
What evaluation methods have researchers used to evaluate cardiovascular screening programs in adults?	Medical Students	Document review	Will support an evidence-based approach to evaluating PPS and supply the initial driving force for improvement.
How many people were included in the research? What were the research inclusion and exclusion criteria? How many people were screened overall?	Medical Students	Activity log	Basic information that will help budget and resource planning each year.

Does PPS follow a standardized implementation protocol? How is the process amended?	Medical Students	Document review Open-ended interviews	An updated implementation plan will improve research validity and prevent repetition of ineffective strategies.
Were all volunteers trained in survey data collection, clinical skills, and counseling? Did volunteers follow clinical guidelines? At what cut-off values did volunteers make referrals?	Medical Students Doctors & Faculty	Document review Open-ended interviews Activity log Open/closed-ended surveys	Standardized training, guidelines, and referrals will improve internal validity and ensure equal and appropriate treatment of patients.
Were the surveys culturally sensitive or not? Have volunteers' thoughts or feelings on the cultural sensitivity of the surveys changed, or not, now that they have been to Mexico?	Medical Students Doctors & Faculty	Focus Groups Open/closed-ended surveys	Improving cultural sensitivity can enhance community trust, patient knowledge, and patient outcomes.
Could patients understand what they were told in counseling sessions? Were counseling sessions culturally appropriate?	Church Delegation Community Members	Open-ended interviews Focus groups Open/closed-ended surveys	Will enhance community trust, patient knowledge, and patient outcomes.

Access to Care: Short-term Objective 3: Within one year, PPS first year medical students will add patient identifiers to the IRB to track patient follow-up.

Evaluation Question	Participant(s)	Evaluation Method	Information Use
What other IRB sections will PPS have to alter if we add name identifiers? Will PPS need to upgrade from an expedited review to a full board review?	Faculty Advisor IRB Board Member Coordinator	Open-ended interviews	Will accelerate the IRB approval and protect patient rights.
Will adding patient identifiers change the number of new communities that PPS can screen?	Medical Students Doctors & Faculty Church Delegation	Open-ended interviews Activity log	Will weigh the benefits of tracking follow-up against the harms of potentially reducing the number of communities.
Will community members be receptive to giving PPS their names?	Church Delegation Community Members	Focus groups Open-ended interviews Open/closed-ended surveys	Will ensure that patients have input in a decision that affects their care.
Are the current privacy measures sufficient to protect patient identity? How will PPS maintain privacy?	Faculty Advisor IRB Board Member Coordinator Community Members	Open-ended interviews	Will protect patient rights and provide insight into how PPS can improve privacy.

What patient information will PPS track over the years?	Faculty Advisor Medical Students Doctors & Faculty Church Delegation Community Members	Document review Open-ended interviews Open/closed-ended surveys	Will identify the relevant factors that affect patient health, that support the research, and that reflect patient preferences.
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Access to Care: Short-term Objective 4: Within one year, PPS planners will improve the referral system with local doctors to track continued patient care and medications.

Evaluation Question	Participant(s)	Evaluation Method	Information Use
Were PPS's efforts to ensure follow-up care effective or ineffective? In what ways can PPS improve follow-up care?	Medical Students Doctors & Faculty Church Delegation Community Members	Open-ended interviews Focus groups Open/closed-ended surveys	Will identify ways to improve follow-up care from the perspective of all stakeholders.
How many patients with high values were given referrals by medical students? How many people that PPS gave referral papers to went to a referral appointment?	Medical Students Local Doctors Community Members	Activity log Open-ended interviews Open/closed-ended surveys	Will determine to what extent PPS follow-up efforts are succeeding and to what extent they are failing. Students will track changes in follow-up after they adjust the process.
How many patients that underwent PPS screening the previous year returned for PPS screening the next year?	Medical Students Community Members	Activity log Open/closed-ended surveys	Will be an indirect measure of patient satisfaction and allow PPS to track follow-up.
What barriers exist that prevent patients from following-up with a doctor? How can PPS attempt to overcome these barriers?	Medical Students Community Members Local Doctors JR Secretary of Health and Education Church Delegation	Document review Open-ended interviews Focus groups Open/closed-ended surveys	Will identify the full scope of the follow-up problem, and determine which barriers are surmountable.
How can PPS better integrate the Mexican health care workers into the project?	Medical Students Doctors & Faculty Church Delegation Community Members	Document review Open-ended interviews Focus groups	Mexican health workers will continue to see PPS patients during the year. Will improve follow-up, sustainability, and empowerment.

Health Education: Short-term Objective 5: Within one year, 100% of medical students will have undergone health education training, gaining knowledge and skills.

Evaluation Question	Participant(s)	Evaluation Method	Information Use
How were the health education talks (Charlas) effective or not effective? Were the medical students properly or improperly trained in health education?	Medical Students Doctors & Faculty Community Members Church Delegation	Open-ended interviews Focus groups Open/closed-ended surveys Document review	Will help tailor Charlas to be more effective. If training is inadequate, PPS can use more thorough training to teach evidence-based techniques.

How many students have undergone health education training?	Medical Students	Open-ended interviews Activity log	Will ensure that medical students missing training sessions receive alternate training.
Were the health talks culturally sensitive or not? If not, how can PPS improve cultural sensitivity?	Community Members Church Delegation	Open-ended interviews Focus groups Open/closed-ended surveys	Tailoring the talks to be more culturally sensitive will improve their clarity.
Did the community members understand the Charla information or not? If not, how can PPS improve understanding?	Community Members Church Delegation	Charla activities Open/closed-ended surveys (pre-post test) Open-ended interviews Focus groups	Will improve the clarity of the Charlas. Will help PPS track the association between the Charlas and community knowledge.

Access to care: Long-term Objective 1: Within 5 years, 90% of referred patients will be seen by local doctors for follow-up.

**Improvement in follow-up is a continuous, yearly goal that will be evaluated as both a short-term and long-term objective. The evaluation questions for Long-term Objective 1 are therefore akin to the evaluation questions for Short-term Objective 4.*

Health Education and Impact: Long-term Objective 2: Within 5 years, volunteers will observe measurable changes in cardiovascular knowledge and lifestyle practices among the rural community members.

Evaluation Question	Participant(s)	Evaluation Method	Information Use
How can PPS measure change, or lack of change, in community knowledge over one, five, and ten years? How can PPS measure change, or lack of change, in community lifestyle practices over one, five, and ten years?	Medical Students Doctors & Faculty Church Delegation Community Members	Document review Open-ended interviews Focus groups	Will develop appropriate indicators to measure deltas in knowledge and lifestyle practices, involving all stakeholders. Will identify evidence-based indicators through literature searches.
How have participant perceptions of knowledge and lifestyle change, or lack of change, altered over the years?	Community Members	Open-ended interviews Focus Groups Open/closed-ended surveys	Will help PPS know stakeholder perceptions, regardless of quantified changes.
What prior cardiovascular knowledge did intervention and control communities have? What prior lifestyle practices did intervention and control communities have?	Community Members	Document review Open-ended interviews Focus groups Open/closed-ended surveys	Will provide baseline data for the intervention and control communities to help determine if change has occurred. Will discover gaps in knowledge and help disperse misconceptions.

Did the cardiovascular knowledge in the communities improved over baseline, or not? If change was present, what was the magnitude? Is a yearly pattern evident? Did the cardiovascular knowledge in the intervention group improve relative to the control group?	Community Members	Focus groups Open/closed-ended surveys (pre-post test & comparison groups)	Will help PPS know if the intervention is achieving the desired outcome of improved cardiovascular knowledge.
What other factors and potential confounders may have contributed to community knowledge?	Community Members Church Delegation JR Secretary of Health & Education Local Doctors	Document review Open-ended interviews Focus groups Open/closed-ended surveys (pre-post test & comparison groups)	Will strengthen internal validity of the outcome analysis.
Have the lifestyle practices improved over baseline, or not? If change was present, what was the magnitude? Is a yearly pattern present? Did lifestyle practices in the intervention group improve relative to the control group?	Community Members	Open-ended interviews Focus groups Open/closed-ended surveys (pre-post test & comparison groups)	Will help PPS know if the intervention is achieving the desired outcome of improved lifestyle behaviors.
What other factors and confounders may have contributed to community lifestyle practices? How can PPS measure change in ways other than self reporting (indirect, unobtrusive measures)? ⁶²	Community Members Church Delegation JR Secretary of Health & Education Local Doctors Medical Students Doctors & Faculty	Document review Open-ended interviews Focus groups Open/closed-ended surveys (pre-post test & comparison groups)	Will strengthen internal validity of the outcome analysis. Will use triangulation to temper self-reporting bias.
What barriers to change exist, and how might PPS help circumvent these barriers?	Community Members Local Doctors JR Secretary of Health and Education Church Delegation	Document review Open-ended interviews Focus groups Open/closed-ended surveys	Will help PPS address those barriers that prevent community change.

Impact: Long-term Objective 3: Within 10 years, volunteers will observe measurable improved cardiovascular health in the communities.

Evaluation Question	Participant(s)	Evaluation Method	Information Use
How can PPS measure the effect, or lack of effect, of the program on the health of the communities?	Medical Students Doctors & Faculty Church Delegation Community Members	Document review Open-ended interviews Focus groups	Will help PPS know if its current implementation strategy

<p>What were the baseline cardiovascular risk factors in the communities prior to PPS intervention?</p> <p>What are the documented baseline risk factors for the JR area?</p>	Community Members	<p>Document review of epidemiological data</p> <p>Baseline clinical tests</p> <p>Open/closed-ended surveys</p>	Will provide baseline data for the intervention and control communities.
<p>Has the cardiovascular health in the communities improved over baseline, or not?</p> <p>If change was present, what was the magnitude?</p> <p>Has the health improved relative to other communities in the area?</p> <p>Have the communities perceived a change?</p>	Community Members	<p>Document review of epidemiological data</p> <p>Open-ended interviews</p> <p>Focus groups</p> <p>Open/closed-ended surveys (pre-post test & comparison groups)</p> <p>Secondary data analysis</p> <p>Clinical tests</p>	Will help PPS know if the intervention is achieving the desired impact of improved cardiovascular health.
<p>What other factors and potential confounders may have contributed to cardiovascular health?</p>	<p>Community Members</p> <p>Church Delegation</p> <p>JR Secretary of Health & Education</p> <p>Local Doctors</p>	<p>Document review</p> <p>Open-ended interviews</p> <p>Focus groups</p> <p>Open/closed-ended surveys (pre-post test & comparison groups)</p>	Will strengthen internal validity of the impact analysis.
<p>Did participants perceive a change, or lack of change, in health as a result of the Charlas?</p> <p>As a result of the screenings?</p> <p>As a result of increased involvement of local doctors and improved infrastructure?</p>	Community Members	<p>Open-ended interviews</p> <p>Focus groups</p> <p>Open/closed-ended surveys</p>	Will determine participant opinions as to what are the most effective tools that PPS uses to improve cardiovascular health.

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